SPECIAL ISSUE: The 100 Hottest Hardware Buys!!

JUNE 1995

PC Computing

Windows 95

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plus Desktop Superguide

Inside: Your complete shopping guide to over **100 top systems,** printers, scanners, CD-ROMs, sound cards, modems, **and more!**

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IN CHUGWATER, WYOMING

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If there is one thing we all have in common, it is a need to express ourselves. For some folks in Wyoming that need gets met every time they tune in to National Public Radio's® *The Thistle & Shamrock*® show, which airs Saturday evenings on Wyoming Public Radio. (Just tune in to 91.9 on your FM dial.)

Now aside from having a need to express themselves, NPR also has a rather urgent need to be heard. Which begins to explain why they're such keen users of Microsoft® Word 6.0.

The simple fact is, NPR is all about intelligent communication. So it stands to reason that they'd use an intelligent word processor. Especially if they were trying to do something like show the station that a Celtic music program could be the biggest thing to hit Chugwater since the blizzard of '69.

For such a job they'd surely want to add charts and graphs. They'd want to drag stuff from one document and drop it into another. They'd want automatic formatting. They'd want to whip up a table of contents. Simply put, they'd want to make their point so well that the station's staff would be happy to change their programming. And why shouldn't they be? NPR already knew how it would make their listeners feel.

Of course we're not going to say Chugwater would have turned into a cultural wasteland if it weren't for *The Thistle & Shamrock* show. We're just saying that the more clearly you get your point across, the more likely it'll be heard. (Something to think about next time you're looking for a raise.)

And now for a few words from our sponsor: If you'd like to hear a little more about Microsoft Word 6.0 or any of the other fine products that make up Microsoft Office, just give us a call at (800) 240-4782, Department NEC. We're sure you'll be impressed with the reception.

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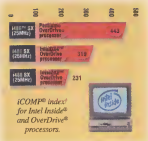

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Hard Drive	420MB	420MB	720MB
Cache Internal	8KB	16KB	16KB
Cache External	256KB (optional)	256KB	256KB
Local Bus Graphics	PCI	PCI	PCI
Video Memory/Max.	1MB/2MB	1MB/2MB	2MB/4MB
Compaq SVGA Color Monitor	Yes	Yes	Yes
Diskette Drive	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB
Expansion Slots (Total)	3	4	5
Drive Bays (Total)	3	4	5
Ports: Serial/Parallel	1/1 (ECP)	1/1 (ECP)	1/1 (ECP)
Security Features	Yes	Yes	Yes
101-Key Keyboard, Mouse	Yes	Yes	Yes
Software Preinstalled	MS-DOS® 6, MS-Windows® 3.1	MS-DOS 6, MS-Windows 3.1	MS-DOS 6, MS-Windows 3.1
Energy Star Compliant	Yes	Yes	Yes
Warranty†	3-Year	3-Year	3-Year

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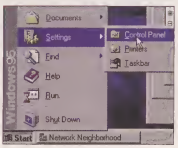
PC Computing JUNE 1995 VOLUME 8 NUMBER 6

Windows 95 It's Here!!

Microsoft's long-awaited Windows upgrade is finally ready for business—sort of. You'll be surprised by what we found when we tested the preview release for performance and compatibility with existing hardware, software, and networks. **176**



SUPERGUIDE

The Desktop 100

If it's time to purchase new hardware, you're in the right place. We tested the usability and performance of over 100 top products to make it easy to assemble a complete solution that's just right for you. **122**

Power Printers

From high-end color dye sub to low-cost ink jet, the best output options are all here. We tested 26 printers so you can find the one that fits your needs. **144**

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USABILITY APPROVED: *Wherever you spot this seal, you've found hardware or software that meets or beats the tough standards of our usability test labs.*

ONLINE EXTRAS: *This symbol means you'll find freebies, bug patches, and other bonuses on our Internet Web site, our PC Contact forum, or our CD-ROM.*

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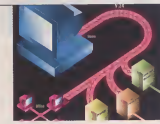

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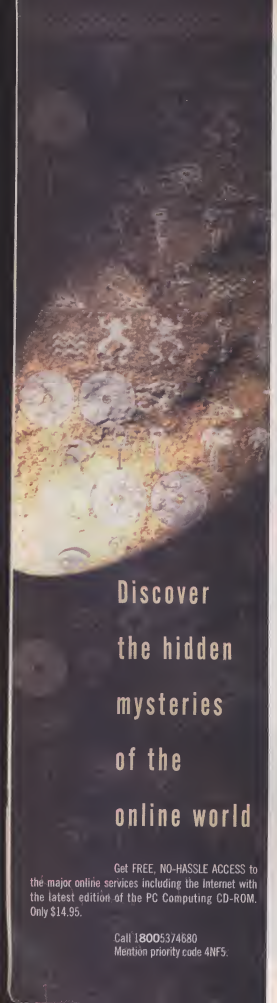

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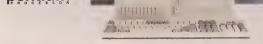

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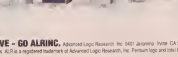

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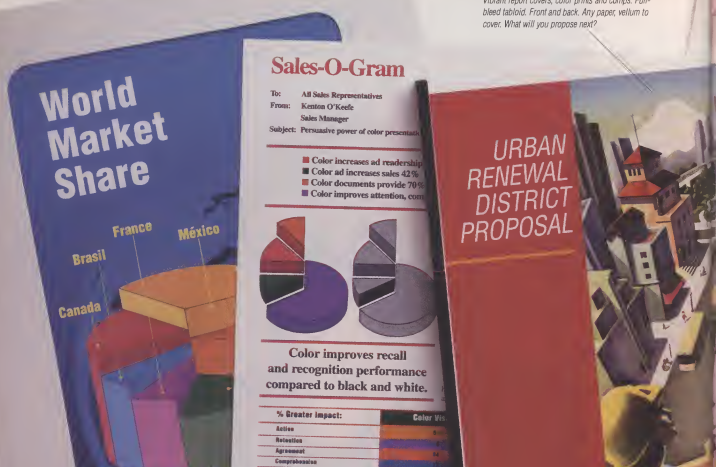

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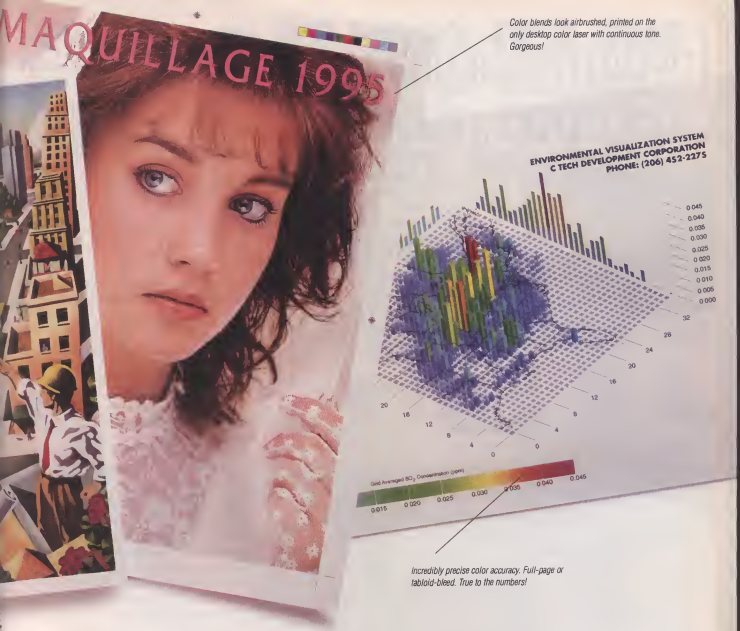

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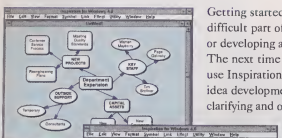

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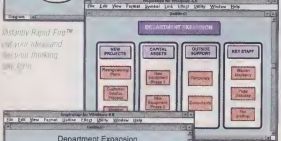

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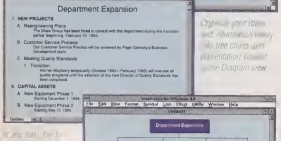

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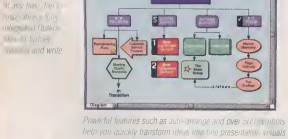

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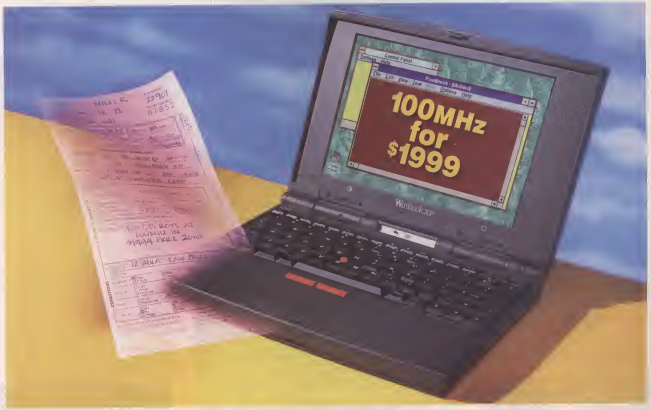

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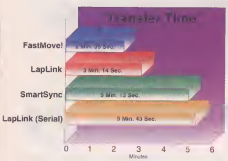

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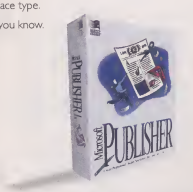

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Stiff neck, bleary eyes, or cramped wrists plaguing you? For fast relief, check out page 304 for our look at worthy ergonomic gizmos and peripherals in the comfort zone.

Usability Unbound

Cracking the case: There's nothing worse than a PC with a case you can't crack open without risking bodily injury—except maybe a PC with a manual you can't crack open without risking mental instability. You might not need to crack open the PC or the manual when the shiny new machine you've selected from this month's Desktop Superguide first arrives. But sooner or later, you'll need to repair something, or you'll decide it's time to upgrade some components, subsystems, or peripherals. After all, today's envelope-pusher is destined to become tomorrow's doorstop faster than you can say, "Pick a peck of P6 processors." That's when you'll thank yourself for choosing a system that didn't skimp on the usability details.

And you'll be seeing more products get the full Usability Labs treatment in *PC Computing* than ever before, thanks to a major expansion in our Usability Labs staff and equipment. The research for this month's Desktop Superguide features the most extensive hardware usability testing we've done yet. So we've adopted a number of seals to help you identify products that pass our Usability Labs' rigorous standards:

Usability Tested This icon means that we've conducted a battery of usability tests to evaluate how this product fares in the main areas for which we conduct usability testing (as applicable): how good its online help or printed documentation is, how high the user's overall satisfaction is, and how well the product's usability contributes to boosting your productivity.

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PC Computing Best Of course, usability tells only part of the story. A product earning this seal offers a best-in-its-class balance of usability, performance, features, technology, and price.

Online Extras It's time to go online—to our Web page, PC Contact forums on CompuServe or Prodigy, or our companion CD-ROM—to get the rest of the story. You'll find additional data, bug patches, free software, and multimedia extras that enhance what you'll find in our print edition.

Under Cover So Windows 95 is finally here! But is it the right 32-bit operating system for you? While IBM fans ask "But where's OS/2?" Microsoftics reply: "Exactly!" Decide for yourself, starting on page 176.

Demo of the Month *Question:* How do you keep a gullible reader in suspense? *Answer:* I'll tell you next month. *Question:* How do you keep *PC Computing* editors in suspense? *Answer:* Keep a hot product under wraps. When the folks from Hewlett-Packard arrived to unveil their much-awaited LaserJet 5P laser printer, reviewed on page 64, they tantalized us by literally keeping it under wraps—veiled beneath a pizza-box cover—for a suspense-filled 30 minutes of exposition that would have made Hitchcock proud. While the 5P proved worth the wait, the nerve-wracking experience and the pizza-box cover prompted Associate Editor and printer guru Kyla K. Carlson to suggest a new demo policy: "Deliver the product in 30 minutes or less, or we get it free."

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SAMSUNG ELECTRONICS

THE COST OF PRODUCT IMPROVEMENT

Paying for Software Fixes

I just read your article about NetWare 4.1 ("An Easy Way to Raise Your Net Worth," March, page 97). This is the only industry in which you could seemingly praise a product for correcting its own massive flaws. A similar article in *Popular Science* might read: "The only problem with Boeing's new 797 is a tendency for the wings to fall off during flight. If the plane does manage to land in one piece, chances are your baggage is halfway around the world. But for only $500 more, the airline will reunite you with your personal possessions." In no other industry would customers pay for the opportunity to correct bad software.

Robin Sheppard
via CompuServe

Net Manifesto War

Regarding Keith Levkoff's mail ("Throw Newbies off the Net?" April, page 25): Why not accept new people on the Net? You don't own it, so don't police it. America Online subscribers want the same online access as other users and have every right to influence the way people communicate and interact online. Fortunately, they will also outnumber you, and the Internet will be a kinder, gentler place for it.

Kevin Carter
via America Online

License to Surf

I couldn't agree more with Mr. Levkoff. I know America Online is set up to be moron-proof, and it gives even seven-year-olds access to the Eighth Wonder of the World. But AOLers have shown everything *but* netiquette. There's a rule list for posting to the Internet, but it isn't enforced and it's never followed. Maybe AOLers should be required to pass an Internet proficiency test before they're allowed to venture forth.

Bill Yazji
via the Internet

Playing NetGod

I never cease to be amazed at the arrogance of the supermouths who apparently slid down the birth canal already wearing the purple of NetGods. Some AOLers (like my 60-year-old self) have been computing since Moses wore short pants, probably before Levkoff was a twinkle in his daddy's eye. Some of us even understand *analog* computers! So, Lev-baby, lighten up! Grab some AOL-newbie by the hand and guide him around. He'll appreciate it, and you can show off your expertise.

Walter E. Murdock
via America Online

Punish the Providers

There is a need for some sort of Internet regulation. It's a nearly lawless environment in which nasty people can and do harass innocent participants with impunity. E-mail and online communications are no more worthy of free speech protection than harassment by telephone. Making providers liable may well be the only practical means of control.

John Navas
via the Internet

Pentium Math to Die For

The now-famous Intel Pentium calculating problem may be small potatoes to some, but to my company it could mean big trouble. Without 15-digit accuracy, our geography-based products would not get the right answer. This could cause a waterworks constructor to dig up a gas line by mistake, for example. Since our customers don't always know that they rely on that accuracy, when Intel tells them that they probably don't have to worry, they may well believe it.

John Russell
Geodyssey Limited

Hidden Roads on the Web Map?

Your March cover story ("Find It and Do It Online," page 112) was great. I especially enjoyed the *PC Computing* road map to the World Wide Web. One thing puzzled me, though. Your map covered a great many basic subject areas—law, business, government, and so on—but nothing in the engineering and scientific areas. Did I miss something?

Everett Kidder
via the Internet

IT'S A WIDE, WIDE WEB. We're working to expand the map to cover everything from archaeology to zoology. Meanwhile, check out a live version of our Internet Web map at the following address: http://www.pc-computing.ziff.com/~pcomp. **RS**

A No-BS BBS

I want to thank you for recognizing local BBSs that are trying to stay alive ("I-Way Patrol," March, page 313). I am the sysop of a BBS in New Jersey. We host thousands of users, have multiple lines available for access, and in January began offering free access to the Internet. Adding Internet access to BBSs is making them more popular than ever. It appalls me to see what some commercial service providers charge for their services. Our BBS provides free access to anyone for 25 minutes a day, or unlimited access for

just $10 for six months. I can understand that commercial service providers are out to make a profit, but it seems perverse that they're profiting by offering access to something they don't even own.

B.J. Weschke
via the Internet

Bitten by a 32-Bit Virus

Thanks for your Help section's Q&A on 32-bit disk access errors when starting Windows ("Active Access," March, page 210). One possible culprit you didn't mention is viruses. I've discovered the Stealth virus on several systems in our office. One of the symptoms of this boot-sector virus is that it disables 32-bit disk access. I started noticing a few computers with this problem and traced it back to one user who was distributing disks. We went to a networked virus-protection scheme that has solved the problem.

J. Garrett
via the Internet

Taking the Bite out of Bugs

Software bugs are rampant. Two cases in point: Inset System's HiJaak Graphics Suite 3.0 and Intuit's Quicken 4 for Windows both trip over their own code under some circumstances. It's impossible to track all software bugs and quirks, but a quick check of the traffic on CompuServe's software support forums will give you a good idea of what's going on in the "real" world. Why not provide a section summarizing the known quirks and compatibility problems of new products?

Donald L. Cohen
via CompuServe

GOOD IDEA. Check out our new Bug Bytes section on page 45 for the lowdown on the latest hardware and software snags and their fixes. **JOC**

Rumors Are Exaggerated

"Windows 95 Unveiled" (April, page 154) claims to dispel the lies and give an unbiased view on Windows 95. On Lie #4 questioning its productivity, all I can say is that my six-year-old was launching apps in five minutes after seeing the "Start" button, and was using the toolbar to multitask in less than ten minutes. I am a Windows 3.1 power user, but I was immediately productive under the new interface. The DOS support is far, far better than it was; all the DOS CD-ROMs that choked under Windows 3.1 now run seamlessly under Windows 95—no configuration required.

As for as Lie #5 about multitasking: Windows 95 isn't NT, but it's much better at juggling multiple tasks than Windows 3.1 is. The computer I run Windows 95 on is old and slow, but this new operating system gave it a shot in the arm.

Jim Hungerford
via CompuServe

Windows to the Future

I eagerly read your article on the ten biggest lies about Windows 95. Congratulations on a well-done article revealing the ultimate truth behind Microsoft's plans to further dominate the operating system future.

James Steiner
via the Internet

PCC's Myst Killer

I just tried *PC Computing*'s new CD-ROM. Wow! I haven't played with a new release so often since Myst. I must say that you got it right. Installation was a snap, and playing the CD-ROM with higher resolution and more colors didn't affect the screen (I can't say that for most of the other CD-ROMs I own).

Carlos M. Sanchez
via CompuServe

WELL, THANKS. By the time you read this, the second edition of the PC Computing CD-ROM will be out—this time focusing on online services. It, too, is not to be Myst. **MCL**

VL-Bus Ride to Nowhere

As I was perusing your survey on CPU alternatives to Intel's Pentium ("Beyond Pentium," April, page 126), I noticed one glaring error about NexGen's Nx586. You state that "NexGen hasn't developed a PCI interface yet, so Nx586-based systems will have no high-speed bus." I work at a local computer retailer, and we have sold several Nx586s, all of which were installed on VESA VL-Bus Alaris motherboards. Sure, VL-Bus isn't as glamorous as PCI, but it's *definitely* high-speed! Besides, if you were looking for a disadvantage to the chip, why didn't you just mention that NexGen hasn't developed a math coprocessor yet?

Mark Kundinger
via the Internet

VL-WHAT? It may be fast, but it's a dead end. Even notebook makers are flocking to PCI. **JM**

Fools' Paradise

Please send my congratulations to John C. Dvorak for his excellent column, "An AFD API," in April (page 45). I hadn't even realized the kind of reverence I evidently attributed to Microsoft. I was completely taken in, only stopping to hit myself in the face when I realized what was going on. After a few seconds of staring blankly at the page, I had to write in and compliment Dvorak on a job well done.

Christopher J. Kucera
via CompuServe

SEEMS LIKE we're not the only tricksters. Let's take you, Mr. Kucera, for example. After all, your name is an anagram for "Just cipher or hacker." **JOC**

April Showers

In your April issue you mention a clip-on shower beeper from Motorola ("Technolust," page 290). If you're in the shower, what exactly does the beeper clip on to?

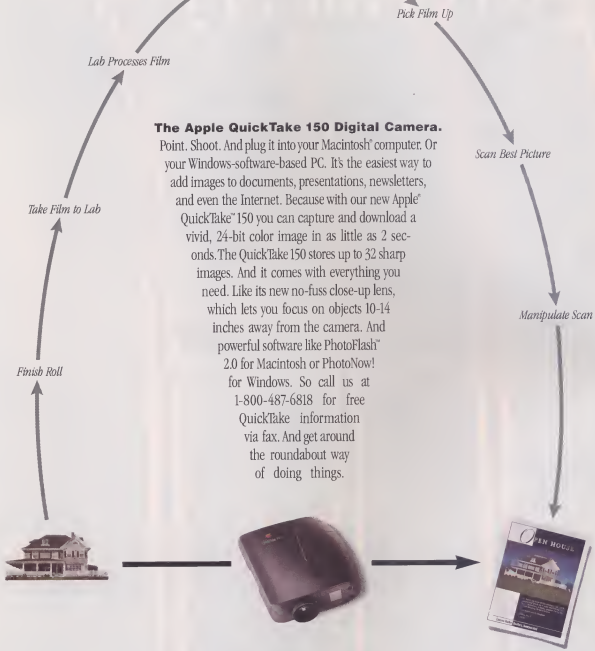
Marla Stauffer
via America Online

MA'AM, PLEASE! This is a family magazine. **RS**

For the Record

"And Now for Something Completely Different" (March, page 200) should have also noted that ViaGrafix also does extensive business with corporate clients—not just retail stores.

Will the Mac survive Windows 95? Send your thoughts about this and other subjects to Mail, *PC Computing*, 950 Tower Lane, 19th Floor, Foster City, CA, 94404; fax: (415) 578-7029; Internet: 72241.1724@compuserve.com; CompuServe: 72241,1724.



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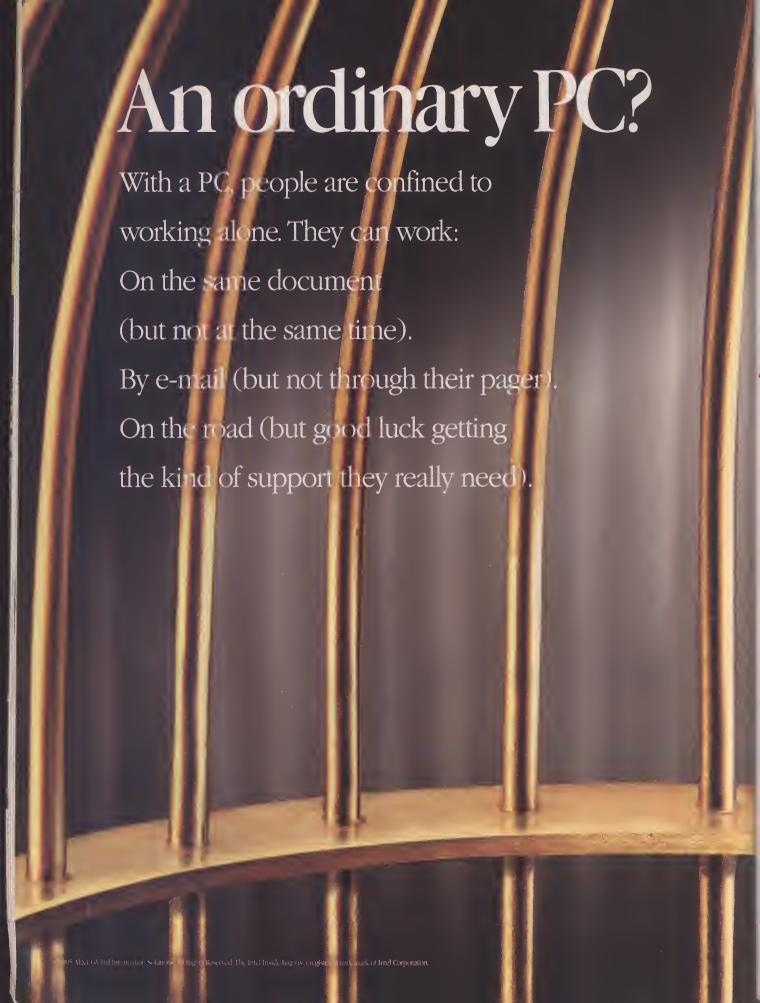

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Coming Soon

Getting on the Net It's exploding! User access to the Internet has grown incredibly. But wouldn't it be great if you could have instant Internet access without all the hassles of difficult-to-use online services? We put five access products through our Usability Labs to see how well combining software and an online service can simplify Internet access for you.

STORAGE SUPERGUIDE It's one of those things everyone wants more of—storage space. With all the multimedia apps and Internet downloads you need, it seems you can never have enough. We test SCSI and Enhanced IDE hard drives and controllers to help you find the best way to store your data.

MONITORS Not only can a dull monitor be annoying, it can hinder productivity and performance. You deserve the sharpest, clearest view, so we show you where to look. Our performance lab tests 17-, 20-, and 21-inch monitors to find the best view.

WINDOWS 95 One of Windows 95's claims to fame is built-in remote access. Soon you will be able to access a remote network while at a Windows 95 system, by modem to a Windows NT server. We evaluate this process and examine products that will bring it full function.

ALSO NEXT MONTH

Crossroads Which will win the Great OS War: OS/2 or Windows 95?

Working Smarter You think WordPerfect 6.1 is perfect? Ron White shows you how to make it even better by revealing some expert tips.

Do It Yourself Vince and Woody illustrate how to create your own wizard for Microsoft Word 6.0.

New! A first look at new portable CD-ROM drives, a fax document manager, and other breakthrough products.

Edge Check out the best CD-ROMs for remodeling your home and office.

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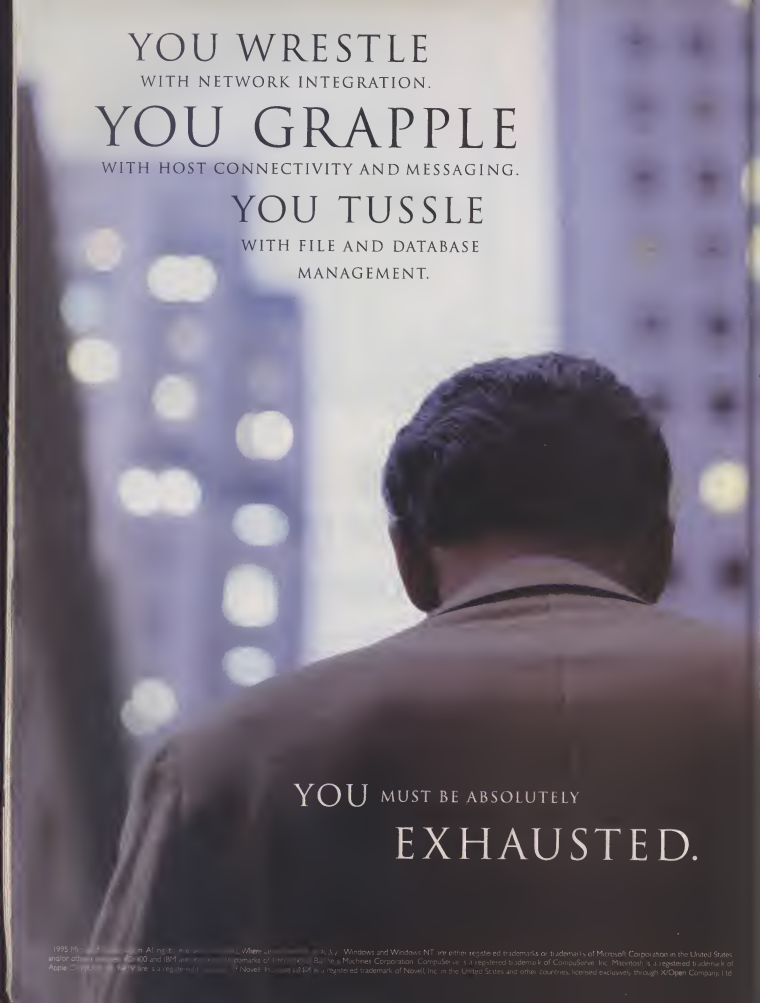

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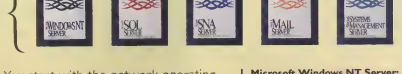

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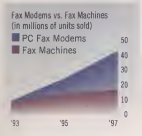
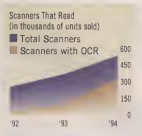


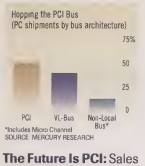
SOURCE: BIS STRATEGIC DECISIONS

Fax Everywhere: Sales of PC fax modems zoomed past stand-alone fax machines in 1994 and are expected to increase 45 percent through 1997.



SOURCE: BIS STRATEGIC DECISIONS

Scan It, OCR It: Optical character recognition software is becoming an inseparable part of any desktop scanner sale as prices on both types of technologies plummet.



The Future Is PCI: Sales of PCs using the PCI local-bus architecture surpassed those with VL-Bus for the first time this year; Micro Channel sales continued to evaporate.

TECHNOLOGY WATCH

Behind-the-Scenes OCR

They say this is the era of the paperless office, but have you noticed your file cabinet slimming down? Don't throw out any manila folders yet. Windows 95 and huge fax modem sales will have us all pushing paper around faster than ever.

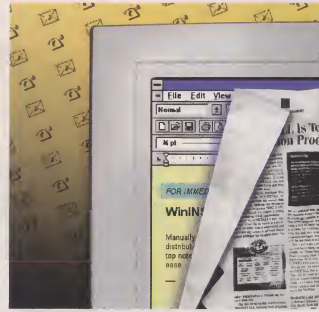
You'll need a few paperless-office tools—a scanner and optical character recognition (OCR) software—just to keep up. The good news is that prices on both of these are plummeting, while quality and usability are improving.

With 14.4Kbps fax modems selling for around $100 and being bundled free with virtually every desktop PC these days, analysts expect installations to grow 45 percent every year through 1997.

Much of that growth will come from Windows 95 with its Plug-and-Play board installation/recognition and built-in faxing. When it ships, you'll be able to send and receive faxes from its desktop Inbox without buying and learning another software package. Many of the 40 million people expected to switch over to Windows 95 have or will buy fax modems. And many of these people will have your phone number, so figure on your fax modem getting a lot busier.

It won't be long, however, before you'll want to turn those fax bitmaps into less bulky text files that you can edit, duplicate, store on your hard drive, and print out for easier reading. No doubt you'll also need to send hard-copy documents from your desktop from time to time.

A scanner with OCR software is the answer, and they're getting cheaper every day. Many have the OCR software thrown in free of charge. The $500 price tag on Hewlett-Packard's market-leading ScanJet 3p is half of what it was a only year ago, and it comes with Caere's WordScan 3.0. Canon, Logitech, Microtek Lab, and many other scanner makers are following suit. Even if you have to pay for an OCR



Less-Paper Office: With faxing built in to Windows 95, a fax avalanche is headed our way. OCR may dig us out.

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PHOTO ILLUSTRATION BY PETER ALAN GOULO

program, the brand-new WordScan Plus 4.0 is only about $360 on the street, down from over $500 for Version 3.0. Caere's pared-down OmniPage Direct sells for just $69.

You'll find the new OCR software to be far more accurate and usable than prior versions. Developers are working on improving recognition for degraded documents, which, thanks to faxes, will probably comprise most of your paper volume in the future. Too often faxes are faded copies of faxed copies replete with fly specks, smudges, and split characters. Caere is merging its WordScan and OmniPage Pro engines into a promising new version that will have improved recognition and usability as well as a much lower price tag.

A fax blizzard is headed our way, and an OCR-equipped scanner is the tool you'll need to dig out from under it. **MH**

Take That, Ma Bell Tired of a phone bill with charges, surcharges, and taxes from half a dozen different carriers and government agencies? How does free long-distance calling sound? No, it doesn't require hacking the system, and there are no Cap'n Crunch whistles required. It seems that the Internet can carry voice transmissions as well (well, almost as well) as data files. Motorola will bundle VocalTec's $50 Internet Phone with its 28.8Kbps modems, opening up the prospect of long-distance and even international calls from your speaker-equipped desktop for as little as a dollar an hour. OK, it isn't pin dropping or Truevoice quality—yet. But Motorola and VocalTec aren't the only companies that are working on the problem. **MH**

Paper Floppy Drive

It's almost like having a paper slot in your PC. **Delrina's WinFax Scanner** bar sits **unobtrusively** between your keyboard and PC. Slip a document into its **ten-sheet feeder** and Delrina's built-in software asks you whether you want to file it as a bitmap, **convert it** to an editable file, **fax it, or e-mail it.** Also included: WinFax Pro 4.0. **MH**

WinFax Scanner / Delrina Corp. / (800) 268-6082 / $300 est. street price / *Reader Service No. 605*

28.8Kbps Modems

What price fast data transfer? Here are the best deals we found on internal 28.8Kbps modems as of April 1, 1995.

Product	Price
Infotel 28.8 V.34 *MidWest Micro* *(800) 972-8822*	$149
Harmony 28.8 *Harmony Computers* *(800) 441-1144*	$159
Boca V.34 *Computer Discount Warehouse* *(800) 726-4239*	$169
Supra V.34 *Midwest Computer Works* *(800) 869-6737*	$199

Reader Service Numbers: MidWest Micro *606;* Harmony Computers *607;* Computer Discount Warehouse *608;* Midwest Computer Works *609*

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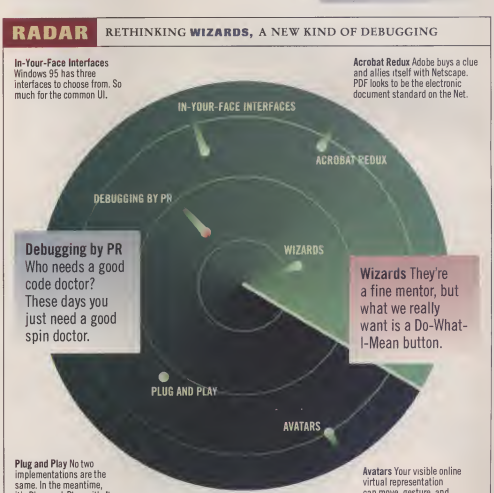


In-Your-Face Interfaces Windows 95 has three interfaces to choose from. So much for the common UI.

Acrobat Redux Adobe buys a clue and allies itself with Netscape. PDF looks to be the electronic document standard on the Net.

Debugging by PR Who needs a good code doctor? These days you just need a good spin doctor.

Wizards They're a fine mentor, but what we really want is a Do-What-I-Mean button.

Plug and Play No two implementations are the same. In the meantime, it's Plug-and-Play-with-It-until-It-Works.

Avatars Your visible online virtual representation can move, gesture, and interact with other avatars. Emoticons are doomed to become a footnote.

What's on the Scope? If a blip is near or moving toward the middle of the radar screen, check it out. If it's moving off the screen, steer clear for now.

Get More from Your Mouse

Think that plastic rodent on your desk is just for pointing and clicking? Think again.

Mouse Systems' ProAgio adds a roller button that scrolls up, down, or sideways from anywhere onscreen. It automatically scrolls through directory windows and applications, lets you program it for shortcuts, and has a task-switcher button on the side that replaces Windows 3.1's klunky Alt-Tab key combination

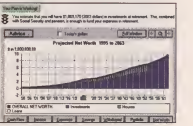
Logitech's TrackMan Vista turns the trackball upside down and places the shiny green ball where your index finger sits, not by your thumb. It requires more work from your finger, but it accommodates the rest of your right hand by curving to the left, naturally placing your thumb next to a side button.

For something completely different, Kantek's wireless Spectrum Ringmouse reduces a mouse down to pinkie size. The Ringmouse attaches to your index finger with a Velcro strap and offers all the features of a regular mouse. Plus, it adds a depth range for flying forward and backward when using 3-D software. **JOC**

ProAgio / Mouse Systems / $49 est. street price / (800) 886-6423 / *Reader Service No. 610*
TrackMan Vista / Logitech / (800) 231-7717 / $89 est. street price / *Reader Service No. 611*
Spectrum Ringmouse / Kantek / (800) 536-3212 / $99 est. street price / *Reader Service No. 612*

Planning to Retire in Style

Quicken can help you get your checkbook under control today, but what about planning for your retirement? Intuit's new **Quicken Financial Planner** provides step-by-step basics for retirement planning. It helps with tax estimates and distributions on seven types of **retirement plans,** including 401(k), IRA, 403b, and Keogh. Video clips of **Jane Bryant Quinn** guide you through trickier decisions, and you can import any existing financial data from Quicken. Also on the CD: **Quicken Mutual Fund LookUp** for 4,400 Morningstar mutual funds. **RS**



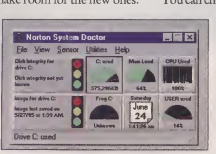
Quicken Financial Planner / Intuit / (800) 624-8742, (415) 322-0573 / $39 est. street price (disk or CD-ROM) / *Reader Service No. 613*

NORTON UTILITIES PREVIEW

The Doctor Is in Beta

It takes a certain leap of faith to trust your irreplaceable data to an operating system that's still under development. So does the prospect of protecting your data with another piece of pre-release software make you twice as nervous? Probably not, as long as Peter Norton's name is on the disks.

Norton Utilities Preview for Windows 95 is designed specifically for the new OS, and even at this early stage, it's chock full of features. First on the list is a suite of Pre-Install Tune-Up utilities that check and optimize your hard drive, create an emergency disk, and offer you the option of trimming away duplicate files to make room for the new ones.



Dashboard on Steroids: Norton System Doctor fills you in on every aspect of your system's configuration.

Once you get Windows 95 installed, the 32-bit applications bundled in Norton 95 cover most of the ground expected from Norton Utilities. Some, like the Rescue Disk and Norton Disk Doctor applets, are simple updates of old favorites that have Microsoft-developed equivalents now. Others, like the Enhanced Recycle Bin, add missing functionality to Windows 95 features. But the Norton System Doctor is all new and potentially Norton 95's hottest feature.

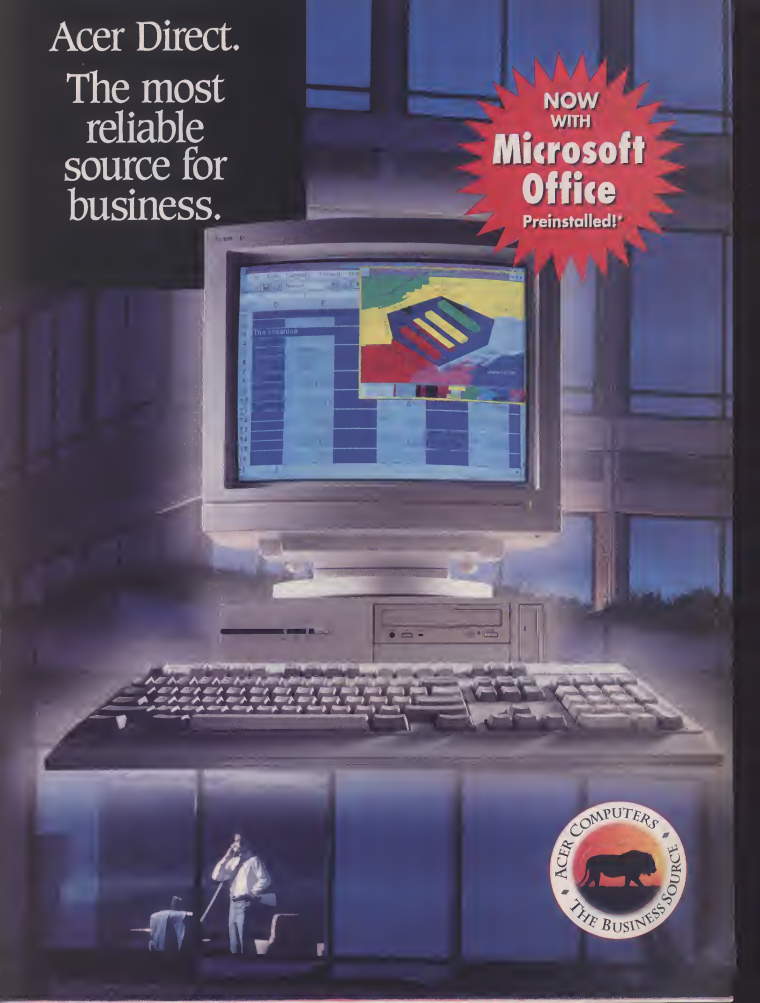
Like Windows' classic Dashboard, Norton System Doctor uses an onscreen panel to supply you with crucial information about the state of your PC. You can choose from 25 gauges (called Sensors) in an onscreen panel that keep you up-to-date on the status of system resources, memory, CPU usage, threads, even how long you've been computing since you last rebooted. Click on any Sensor to set alarms and other options; double-clicking hides the title bar and menus. All the pieces in System Doctor have a consistent look and feel that fits right into the Windows 95 environment, with full support for right-mouse-button shortcut menus and extensions to the default Windows property sheets.

You'll use those property sheets to fine-tune each sensor. The Disk Integrity module, for example, lets you scan one or more disks automatically at intervals that you choose (the default is one hour). And if it finds an error, you can choose to correct it automatically or ask Norton 95 to pop up an alarm so that you can decide what to do next.

If you're evaluating the Windows 95 preview version, you can check out Norton Utilities Preview for Windows 95 for $30 plus shipping and handling. To order, call Symantec directly at (800) 441-7234. **EB**

Contributors to Pulse: MIKE HOGAN, JAMES OLIVER CURY, MATTHEW LAKE, ED BOTT, AND RICH SCHWERIN. *Edited by* WENDY TAYLOR.

PHOTOGRAPH BY ARNOLD TOSKEI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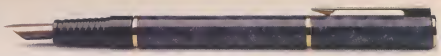

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Bug Bytes

Quick Fixes to Software Glitches and Hardware Gotchas by Doug Vargas

Excel 5 Fears the Unknown

Hey, Excel 5.0 users: Are you afraid of Dr. Ruth? You should be. Excel 5.0 crashes when its spelling checker encounters a known word followed by a period, space, and unknown word. Like . . . Dr. Ruth!

Fix: The best precaution is to update Excel to Version 5.0c. To obtain the update, contact Microsoft at (800) 426-9400. Dr. Ruth would be glad to know that you're doing the safe thing.

Compaq LTE Elites Fixed in a Flash They're tiny and cute, and Compaq's LTE Elite color notebooks can crank away for hours without help from the electric company. Compaq also wisely gave them flash-ROM BIOSs, so you can update the system ROM via software. This is a good thing, because units with a ROM dated before November 7, 1994, may have problems using external mice and experience hard-drive lock-ups. (To check your LTE Elite's ROM version, hit F10 during startup and select the Inspect option.)

Fix: These issues have been resolved in the latest flash-ROM update for the LTE Elite family. You can download it from Compaq's support BBS at (713) 378-1418. The file is called SP1077.ZIP, and instructions are included on how to "flash" the machine's ROM to the latest version.

Sound Check for Microsoft Encarta The old family encyclopedia was a pain to use and dust, but it didn't crash your PC. With a CD encyclopedia, however, it's a different story. In some cases, Microsoft Encarta 95 mysteriously locks up a system.

Fix: There are two things to check: If you're using an ATI video card, obtain the latest video driver from ATI's BBS at (714) 727-4132. Also, try turning off "menu and button sounds" on Encarta's Settings menu.

A Slow Spell for WordPerfect WordPerfect and Quattro Pro get along like two peas in a pod, right? Yes, but it depends on which of the peas is installed first. Although WordPerfect 6.1 for Windows has received high marks from both fans and critics, some people have found that its spelling checker . . . takes . . . forever . . . or fails completely. This problem occurs when Quattro Pro 6.0 for Windows is installed after WordPerfect.

Fix: If you're encumbered by snail-slow spelling checks (and you installed Quattro Pro after WordPerfect), the answer for now is to reinstall WordPerfect completely (all ten disks, I'm afraid).

Want More?

Get weekly bug updates and software fixes from our Web page or our CompuServe forum (see page 298 for details on how to log on). Got a bug to report? Drop Doug Vargas a line via the Internet at 72241.2367@compuserve.com.

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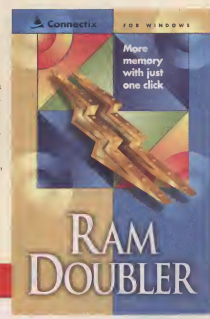
Introducing RAM Doubler™ for Windows® It's software that makes your existing RAM work harder. Forget about buying more memory. Adding more memory to a Windows system doesn't let you run more applications simultaneously. That's because Windows doesn't use your RAM efficiently. With RAM Doubler on your PC you'll get rid of the "insufficient memory" message forever. And you don't have to open your machine. Just run RAM Doubler's 15 second installation and you can run more Windows applications – instantly. Buy RAM Doubler for Windows today, your satisfaction is guaranteed. RAM Doubler is available at CompUSA, Egghead, Computer City and wherever great software is sold (SRP $99).



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System Requirements: A PC equipped with a 386, 486, Pentium or equivalent processor • Windows 3.1 or 3.11, Windows for Workgroups 3.1 or 3.11, running in 386 enhanced mode • 4 MB RAM required, 8 MB RAM recommended • RAM Doubler for Windows works in tandem with any DOS memory extender, such as QEMM or Netroom.

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How Apple is making it easier to move a refrigerator like this.

Today's sales environment is more competitive than ever. Which is why Whirlpool armed its field force with the ultimate sales weapon: the Macintosh® PowerBook™ computer.

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Salespeople are able to tap into Whirlpool's information base at the home office to get competitive information, pricing, inventory data—instantly, during a sales call. This way, they can answer questions more quickly and accurately, make better-informed decisions, appear more professional and, ultimately, close more sales. Plus, with the built-in multimedia capabilities of the PowerBook computer, salespeople can show videos and animations, making a normal sales presentation more persuasive than ever.

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Erv Barnes (left), Director of Information Technology, and Ed Herrelko (right), Executive Vice President of Group Sales, at Whirlpool Corporation, Benton Harbor, Michigan

"Making the sale means having the answer. With this computer, we can get the information our customers need, right on the spot. Making the sale means being persuasive. By delivering presentations on the PowerBook, we can get our point across with enormous impact. Combine this with the fact that it works with our mainframes, Intel-based PCs and Windows, and we're talking about a tool that's not just giving us a competitive edge. It's transforming the way we do business."

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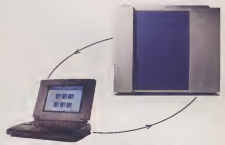

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Apple

"Whirlpool uses FormeRWare from Xcellenet, Inc., for access to the IBM mainframe. Passport for Macintosh from Advanced for IBM 3270 terminal emulation and to Shell Mobile from Lotus Development Corporation to exchange e-mail between Macintosh and Windows environments.

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The A-List

Editors' Top Picks by Wendy Taylor

	Top Pick	The Buzz	The Stats	Issue Reviewed
Systems: High-Performance Pentium	Gateway P5-120	**Yeah, yeah. There are other 120MHz Pentiums out there, but this baby's *loaded*—CD changer and all.**	$4,199, 120MHz Pentium, 16MB RAM, 1.62GB hard drive.	See May 1995, page 62. Reader Service No. 621
Systems: Pricewise Desktop PC	AST Advantage Adventure 6075p	**The complete office-in-a-box: voice mail, fax, and lots of applications. What, no satellite dish?**	$2,399, 75MHz Pentium, 4X CD, 15-inch monitor.	See May 1995, page 67 Reader Service No. 622
Portables	Toshiba Satellite T2150CDT	**Toshiba's signature Portégé design gains a CD-ROM drive—and a battery that goes . . . and goes . . . and . . .**	$4,899, 75MHz 486DX4, 8MB RAM, 500MB hard drive.	See April 1995, page 58. Reader Service No. 623
Portables	IBM ThinkPad 701C	**Gives submotes a new lease on life. Watch the butterfly keyboard fan out when you open the case.**	$4,999, 50MHz 486DX2, 8MB RAM, 510MB hard drive.	See March 1995, page 56. Reader Service No. 624
Portables	Dell Latitude XP 4100CX	**Tougher than a Samsonite, with a battery life that will embarrass the Energizer bunny.**	$2,250, 100MHz DX4, 8MB RAM, 450MB hard drive.	See January 1995, page 124. Reader Service No. 625
Desktop Laser	Hewlett-Packard LaserJet 5P	**You can buy a faster laser, but not a better one. Plus, who needs cables? Beam print jobs to the infrared port.**	$850, 6 ppm, 600 dpi, PCL5e (PostScript optional), infrared port.	See page 64 Reader Service No. 626
Network Laser	Hewlett-Packard LaserJet 4Si MX	**Pages fly out faster than you can trot down the hall and claim them.**	$5,200, 17 ppm, 600 dpi, PCL5	See December 1994, page 154

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The A-List

Editors' Top Picks by Wendy Taylor

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Printers: Network Laser	Hewlett-Packard LaserJet 4Si MX	**Pages fly out faster than you can trot down the hall and claim them.**	$5,200, 17 ppm, 600 dpi, PCL5, PostScript Level 2.	See December 1994, page 134. Reader Service No. 627
Printers: Portable Printer	Citizen PN60	**Less ballast in your briefcase than an umbrella, and the pages look great, too.**	$365, 300 dpi, thermal transfer, 2.25 pounds.	See February 1995, page 64. Reader Service No. 628
Printers: Personal Color Printer	Canon BJC-70	**Small? Check. Crisp output? Check. Color? Yup, it's even got that.**	$259, 360 by 360 dpi (color), 346 cps (mono), 0.8 ppm (color).	Stay tuned. Reader Service No. 629
Video: High-Resolution Monitor	Nanao FlexScan T2-20	**Picture this: more windows per square inch and no migraine-inducing flicker. Your eyes will thank you.**	$995 (17 inch), $1,995 (20 inch), 1,280 by 1,024.	See January 1995, page 88. Reader Service No. 630
Video: High-Resolution Graphics Accelerator	Matrox MGA Impression Lite	**3-D presentations, graphics, and games never looked so good.**	$300, 2MB VRAM, 1,280 by 1024 at 76Hz, PCI interface.	See February 1995, page 70. Reader Service No. 631
Storage: Removable Storage	Iomega Zip drive	**Zippety-zip. Near-hard-drive performance, and the cartridges are removable.**	$200, 25MB or 100MB cartridges, SCSI or parallel.	See page 70. Reader Service No. 632
Storage: CD-ROM Drive	Plextor 6Plex	**CD-ROM times six. Quad-speed drives are a little cheaper, but this is state-of-the-art.**	$550, SCSI connector, 250ms access time, 256K buffer.	See page 67. Reader Service No. 633
Peripherals	Hewlett-Packard ScanJet 3c	**Easy as a copier—and smarter, too.**	$1,179, SCSI-2 interface, 600-dpi resolution, 24-bit color.	Stay tuned. Reader Service No. 634
Peripherals	Creative Labs Sound Blaster Awe32	**Sound so good you'll be tempted to sell your stereo.**	$299, 32-voice polyphony, 16-bit programmable DSP.	See December 1994, page 148. Reader Service No. 635
Peripherals	Diamond Command Center 1440	**Who needs a phone? Manage your voice, data, and fax calls from your keyboard instead.**	$299 (28.8Kbps), $199 (14.4Kbps).	See May 1995, page 76. Reader Service No. 636

The A-List Editors' Top Picks by Wendy Taylor

		Top Pick	The Buzz	The Stats	Issue Reviewed
Desktop Apps	Software Suite	WordPerfect PerfectOffice 3.0	**The best overall business bundle by a nose.**	$659, 386 or faster, 8MB RAM, 40MB to 92MB hard-disk space.	See November 1994, page 85 Reader Service No. 637
	Word Processor	Microsoft Word 6.0	**It types, spells, and draws better than you do.**	$495, 386 or faster, 6MB RAM, 28MB to 32MB hard-disk space.	See December 1994, page 160. Reader Service No. 638
	Spreadsheet	Microsoft Excel 5.0	**Fact is, Quattro Pro and 1-2-3 also get the job done. But usability extras make Excel our top pick.**	$320, 386 or faster, 4MB RAM, 20MB hard-disk space.	See December 1994, page 168 Reader Service No. 639
	Database	Lotus Approach 3.0	**At last! A friendly face in databases. It's quick, it's easy, and there's no programming required.**	$329, 386 or faster, 4MB RAM, 8.5MB hard-disk space.	See March 1995, page 146 Reader Service No. 640
Graphics	Presentation Graphics	Microsoft PowerPoint 4.0	**Create a winning sales presentation—on your lunch hour.**	$340, 386 or faster, 4MB RAM (8MB recommended).	See December 1994, page 178 Reader Service No. 641
	Personal Desktop Publisher	Microsoft Publisher 2.0	**The people's press and the usability champ.**	$89, 386 or faster, 4MB RAM, 3MB hard-disk space.	See December 1994, Page 163. Reader Service 642
	Professional Desktop Publisher	QuarkXPress 3.3 for Windows	**Industrial-strength page layout with tight typography and color control.**	$570, 486 or faster, 8MB RAM, 12MB to 15MB hard-disk space.	See December 1994, page 163. Reader Service No. 643
	Business Graphics	Shapeware Visio 3.0	**Drawing for people who can't.**	$149, 386 or faster, 4MB RAM.	See December 1994, page 205. Reader Service No 644
	Photo Editor	Adobe Photoshop 3.0 for Windows	**Craft digital masterpieces or paint a mustache on the queen—the graphic arts standard for Macs and PCs.**	$550, 486 or faster, 8MB RAM, minimum 20MB hard-disk space.	See November 1994, page 106. Reader Service No. 645
Finance	Personal Finance	Intuit Quicken Deluxe 4	**Take back your checkbook. Get your finances under control quickly and painlessly.**	$39, 386 or faster, 4MB RAM, 7MB hard-disk space.	See April 1995, page 186. Reader Service No. 646
	Business Accounting	Peachtree Accounting 3.0 for Windows	**The least offensive CPA we've ever met. In the works: a CD edition with a Web Browser (we kid you not).**	$139, 386 or faster, 4MB RAM, 12MB hard-disk space.	See October 1994, page 88. Reader Service No. 647
	Investment Planning	Intuit Quicken Financial Planner	**Don't retire without it.**	$39, CD and floppy versions, Windows 3.1, 4MB RAM.	See page 38. Reader Service No. 648
Communications		Delrina Communications Suite 2.1	**One-button fax and modem control. In the works: a bundled scanner for faxing and e-mailing hard copy.**	$109, 486 or faster, 4MB RAM, 10.5MB hard-disk space.	See January 1994, page 126. Reader Service No. 649
		Netscape Navigator	**Don't have to take our word for it; download your own copy from ftp.mcom.com.**	Free ($39, commercial version), 4MB RAM, Internet access.	See April 1995, page 52. Reader Service No. 650
Organization Tools	Personal Information Manager	Lotus Organizer 2.0	**So the interface is a little precious; the networking and usability touches are first-rate.**	$119, 386 or faster, Windows 3.1, 8MB hard-disk space.	See February 1995, page 118 Reader Service No. 651
	Reference	Digital Directory PhoneDisc PowerFinder	**Let your fingers do the walking. Find anyone, anywhere in seconds.**	$199, 386 or faster, Windows 3.1, 4MB RAM, CD-ROM drive.	See November 1994, page 161 Reader Service No. 652
	System Utility	Ballard Synergy d-Time[10]	**Why wait? Soup up your CD-ROM drive with this caching utility.**	$55, CD-ROM drive, 15MB or more of free hard-disk space.	See May 1995, page 100. Reader Service No. 653

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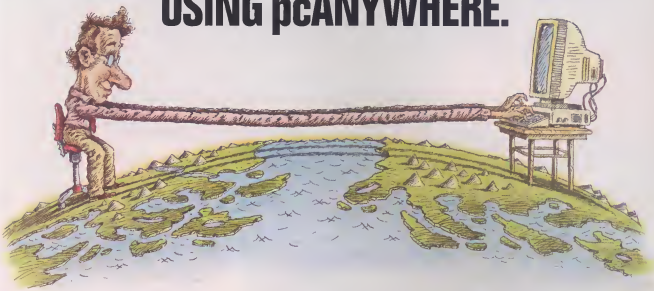

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PC MAGAZINE EDITORS' CHOICE May 23, 1995 pcANYWHERE 10

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"Oh yeah. No question.
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Absolutely.
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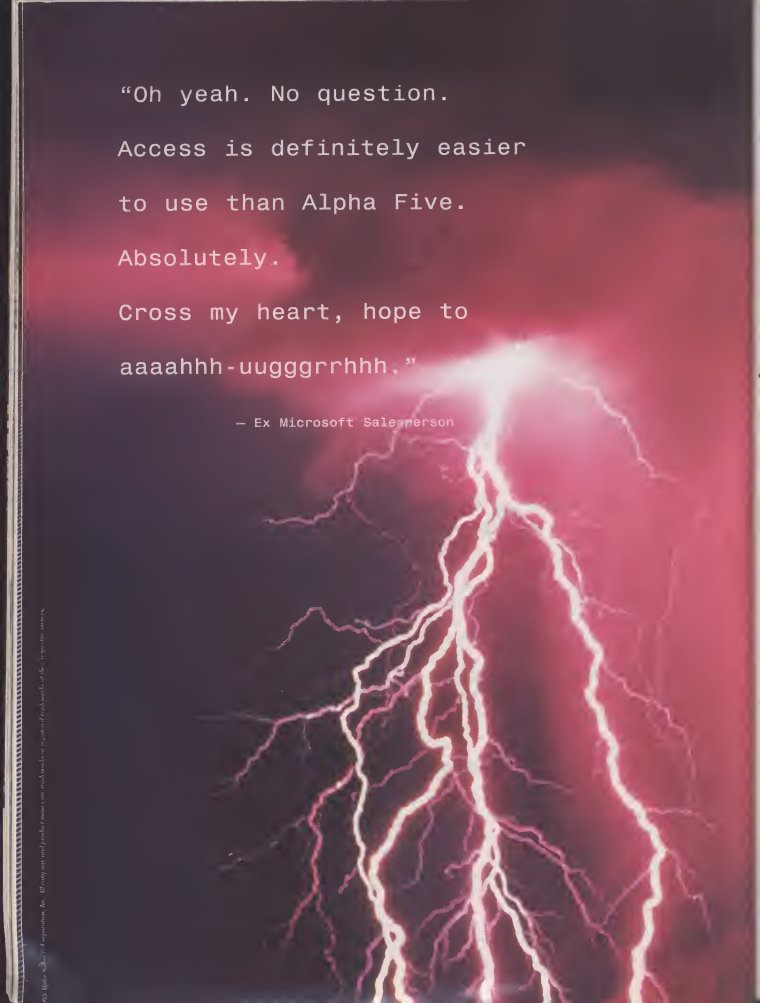
aaaahhh-uugggrrhhh."

— Ex Microsoft Salesmerson



Time and again we run into customers who tell us Microsoft is out there saying Access is actually easy to use. Well, we'd like to set the record straight.

They're dead wrong. Think we're exaggerating? No way. For example, let's say you want to perform a task as fundamental as setting up an order entry system with live inventory updates.

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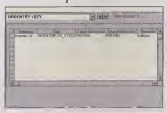
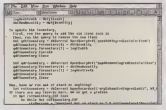
Alpha Five



For fundamental tasks like live order entry, just fill in an Alpha Five table. Or write and debug 51 lines of complex Access code...you decide.



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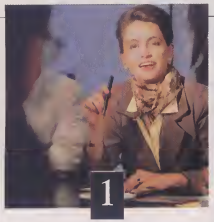

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Paul Somerson

Sen. Cybersexon

It's a beautiful day on the In-ter-net, a beautiful day on the World Wide Web, would you be mine . . ." Mr. Rogers, meet Senator Exon, because if the bluenosed Democratic senator from Nebraska has his way, **GLOPPY PABULUM LIKE THIS** is all you'll be able to send online without risking a six-figure fine and a jail term. Any other "comment, request, suggestion, proposal, [or] image" he doesn't like and you're hosed.

Why all the fuss? Exon is ramming a bill (S. 314) through Congress that would trash the First Amendment, seriously restrict your ability to use electronic media, and kneecap the emerging wired world.

Exon's dangerous bill is titled "The Communications Decency Act," a label that makes voting against it about **AS POPULAR AS VOTING AGAINST OXYGEN.** Predictably, it sailed past its first committee hurdle unopposed. Since few in Congress have the guts to let challengers paint them as "anti-decency" (easily twisted into "pro-smut") in the next election, this bill—which even the staid *New York Times* called "foolish" and "half-baked"—may soon be turning thousands of innocent online users into criminals.

If this **CENSORIOUS CORNHUSKER** gets his way, anyone who sends anything electronically that some prude somewhere thinks is "harassing, obscene, [or] indecent" faces two years in the slammer and a $100,000 fine. That's so absurdly broad that it would criminalize huge amounts of commonly acceptable adult communications, and act as a chilling damper on free speech.

As supposed proof of the need for such draconian legislation, Exon introduced into the record a **WILD-EYED COLUMN** from the *Washington Post* ranting about "computer addiction," and whining how unfortunate it is that e-mail has "the same privacy rights of surface mail." How horrible! Well, old Jim Exon is going to fix that!

Exon claims this benighted bill is needed to shield kids and "protect the sanctuary of the home from uninvited indecencies." Of course, the fact that gutting and sanitizing the Internet in the name of saving children just happens to restrict the same material to adults doesn't matter to him. Neither does imposing **BIZARRE THOUGHT-POLICE CONTROLS** on ordinary communications. Or forcing ordinary businesses and online service providers into becoming snoops who violate privacy and screen every message to avoid being dragged into lawsuits by **PURITANICAL PINHEADS.**

Sure, there's a tiny minority of creeps online, as there is anywhere in society. But parents should take responsibility (a novel idea these days) to teach their kids how to avoid getting into trouble in cyberspace, just as they should teach their children how to avoid problems in other public places like malls or movie theaters.

Exon has already announced his impending retirement. Smart voters should have retired **PARANOID TECHNOPHOBIC PRIGS** like him long ago. Otherwise, we all risk turning the information superhighway into a soulless *Sesame Street.*

PHOTOGRAPH BY JAMES McGOON

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Pentium-90 $2745
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Pentium-120 $3195

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- 16MB RAM, 256K SRAM cache
- 1GB local bus IDE hard drive
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- Diamond Stealth 64 Video PCI local bus graphics card with 2MB VRAM
- 15" SVGA color monitor
- 6-bay desktop case (Pentium-75) 10-bay vertical case (Pentium 90, 100 & 120)
- MS-DOS, Windows for Workgroups, Microsoft Mouse
- Lotus SmartSuite

Pantera™

Pentium-75 $2995
Pentium-90 $3145

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- 16MB RAM, 256K SRAM cache
- 850MB local bus IDE hard drive
- 4X CD-ROM drive, 3.5" 1.44MB FDD
- 16-bit sound card, stereo speakers
- Diamond Stealth 64 Video PCI local bus graphics card with 2MB VRAM
- 17" SVGA color monitor
- 10-bay vertical case
- MS-DOS, Windows for Workgroups, Microsoft Mouse
- Lotus SmartSuite

Pentium-90 $3695
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Best MM Supreme:
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Circle 282 on reader service card.

John C. Dvorak

Déjà Voodoo

I've been watching and waiting for a platform shift over the past few years, hoping this hasn't already happened in the change from DOS to Windows software. I assumed something new would supersede the aging x86 architecture. I figured it would be the PowerPC, but the PowerPC is beginning to look like a Mac platform shift and nothing more.

What went wrong? What can be done to change things? Do we really want to change things anymore?

It dawned on me that the platform shift from CP/M–based systems to MS-DOS or PC-DOS took place under interesting circumstances that haven't been repeated. It's possible the platform shift that gave us the PC was a fluke and will not repeat unless certain circumstances are duplicated.

In 1982, I was not convinced initially that a change would happen. The new IBM PC was slower, had no applications, and was more expensive than comparable CP/M machines that were being mass-produced. I went to ComputerLand and bought a machine with then-guru and CP/M maven George Morrow, who tore apart the unit citing a dozen reasons why it would never succeed. The booing IBM got at the 1977 West Coast Computer Faire was still in the air, and nobody thought Big Blue could get out of its old mold. Also, Apple had captured the business market by introducing VisiCalc for the Apple II. It seemed grim.

But the IBM PC division, then called Entry Systems, was run by mavericks in Boca Raton, Florida, who were outside the control of Armonk. They put in place a liberal dealer-oriented program that the distribution channel loved. People were telling me how "great" the IBM people were, especially when compared to the "arrogant" Apple representatives. Magazines cropped up extolling the virtues of the PC. A crossover add-in card called Baby Blue let people run old applications. New standards were established. Before the PC you had to hand-code most I/O routines yourself to get printers to work! And IBM licensed a recompiled VisiCalc for the PC and sold it under the IBM brand name.

It was a scratch effort that succeeded because the IBMers from Boca did their homework. Before introducing the PC, they knew what they needed to make it sell. They bought machines from every major player including Tandy and took everyone's best ideas. Then they brought the prototypes to dealers to get the bugs ironed out—something the company failed to do with its funky PCjr. IBM found out what the most important applications were and made sure they were ready. Finally, they dropped on a clone of CP/M for the operating system so everyone would feel more at home.

IBM PC MAVERICKS *took from the best machines.* **MICROSOFT** *did its homework, too, combining* **OS/2, MAC OS . . .** *and a responsive* **BETA** *program that borders on the* **RIDICULOUS.**

There is no evidence that IBM takes this tack anymore. From the day of the PCjr through PS/2 and beyond, IBM made all sorts of blunders that could easily have been avoided had the company chatted a little more with dealers and users. For example, when IBM rolled out the PS/2 line in 1987, there was no provision for 5.25-inch disk drives because the company simply decided to convert to 3.5-inch disks. A little premature for such a move.

So when I look back on all the things that made the platform shift happen, the only parallel I can find today revolves around the change from DOS to Windows. Or even the move from DOS/Windows to Windows 95—a much more substantial development. Let's look at this in terms of how it mirrors what happened with IBM and the PC.

First of all, Microsoft did its homework. Just as IBM took the best from the machines out there, Microsoft took the best from operating systems out there, namely OS/2 and the Mac OS. It covered the major applications because it sells applications. As for relationships with the public and dealers, Microsoft's massive beta program borders on the ridiculous as the company tries to improve the product based on user feedback. Furthermore, Microsoft tends to be very responsive, just like those originals from Boca were back in 1982.

Microsoft is a lot closer to the sales and management model that was used to blow the IBM PC into the market than to anything IBM does today. IBM needs to analyze exactly how the PC made it to the top in the first place. I honestly believe the company has no good case studies regarding this bit of history.

Time is running out for a substantial platform shift involving all new hardware and software. When I see Windows 95, or even OS/2 Warp, I believe that a substantial change has taken place—until I get the same old screen telling me about my computer booting this and loading that in huge ugly characters on the 21-inch monitor. Then the drivers kick in and the characters get smaller and I realize it's all an illusion. It is an old car with a new engine. Worse yet, I'm beginning to think that we are stuck with it.

PHOTOGRAPHY BY JAMES McGOON

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intel inside

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Gil Schwartz

DreamSchemes

Remember that big DreamWorks deal? A couple of months ago Mr. Spielberg, Mr. Katzenberg, and Mr. Geffen decided to hitch their wagon to the biggest star in the cybernetic firmament and knock on Mr. Gates' door. As hyperthyroid business entities do all the time these days, the supercreative group walked away with a spanking new joint venture in hand, a promise to work together to develop what we might rightly anticipate to be the most exciting software to come down since WordStar was a kid.

Then nothing but silence.

Now, true, the DreamWorkers have been rushing around shaking billions of dollars in backing out of the trees. And Mr. Gates, Lord knows, has been ever so busy himself, trying to keep his customers happy and all those powerful, greedy competitors at bay. But still. With all the hoopla, and all the promise the fusion of the greatest minds since Einstein met Fermi could produce, why was there no sound from this potential Big Bang at all? What fabulous programs were even now being cooked up?

I could take it no longer. I determined to act. The Microsoft compound was quiet and luminescent in the moonlight when I dropped over the electric fence and padded quietly to the DreamWorks central planning module. I was almost inside when there was a loud snuffling and grunting, and a huge yellow moon-faced guy in a bathrobe and sunglasses popped up in front of me with a threatening expression. That's right. It was Bob. I had to kill him. It was self defense, and I don't think there's a jury in the electronic nation that would convict me for what I did. Five minutes later, wiping a sweet, gooey treacle—all that was left of his interface—off my shirtfront, I was inside. I turned on my flashlight. I peered around me. And what a treasure trove of tomorrow's programming was there!

The room was divided into three areas, with test tubes, electronic gizmoids, monitors, CD players, and other technological effluvia arrayed on a lab table in each work area. The first table was piled high with any number of products in development, each running on machines set up to burn in and debug them. The sheer bulk and splendor of the materials on display here spoke loud and clear that this was Mr. Spielberg's work area. To my right was a demo of something called "Raiders of the Lost Archive," which appeared to be a storage and security program. A skeleton with all the flesh burned off its body was seated by the keyboard there, dramatic demonstration of what would happen to an intruder who attempted to breach the program's righteous code. Right next to this impressive display was a suite of programs running in DOS windows, including the "ET Phone Home Management System," which promised to dial into your home computer "no matter how far out in the galaxy you might be." And, most impressive, there was a huge readout of information under the name "Schindler's Database and List Management System." Great and innovate work was obviously under way here.

It was the deal of the decade: **SPIELBERG AND GATES,** *together at last! When the geniuses behind* **JAWS** *and* **BOB** *team up, the result is* **RAIDERS OF THE LOST ARCHIVE.**

The second sector was no less mind-boggling, for a series of CD-ROMs was spinning industriously away, a monitor and set of headphones connected to each—clearly Mr. Geffen's lab. I carefully put a pair of phones on and regarded a nearby screen. Yes, that was certainly the Butthole Surfers, one of my favorite groups. But what were they doing teaching how to install and service a kitchen sink? The fusion of alternative music with Microsoft functionality was sensational! What a product! A nearby setup featured Courtney Love and her band, Hole, singing and providing an attractive social interface for Mr. Gates' new version of Excel. What a concept! The future is now!

Finally, off in one corner, was a clean, spare work area with one enormous super-P6 on it. The monitor here was tremendous, and as I neared it I heard ominous music playing. Could it be? Yes, it was "It's a Small World," but discordant, in a minor key, with heavy, heavy bass and raw percussion. Of course, this was the diminutive, brilliant Mr. Katzenberg's section, and it was obvious he was into something new and wholly uncharacteristic both for himself and for Mr. Gates' entrepreneurial little company. On the screen, all you could see of yourself from the first-person view was an enormous weapon, something between a flame thrower and a bazooka. And there, in the distance, a man in a finely tailored gray silk suit was attempting to escape the blast of flame and destruction that was surely about to come his way. I peered closely at the fleeing figure, who was attended by dozens of scurrying yes-men armed with briefcases and corporate credit cards. Could it be? It was.

"What a terrible thing to do to that nice Mr. Eisner," I said to myself.

A scrabbling noise came from behind me and to my right, and then to my left, and in front of me, too. Out from the woodwork came Scuzzy and Frizzy and Greasy and Fritz and Flegm, all those little friends of Bob I'd forgotten about. Kicking them out of my way, I scurried home to await our fantastic and Bob-free future.

PHOTOGRAPH BY JAMES McJOON

A road map for the

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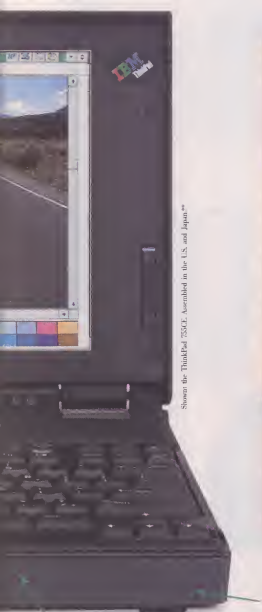
Instant productivity. A host of ***very useful software*** *applications like Lotus® Organizer™ and SoftNet FaxWorks™ come preloaded along with IBM DOS 6.3 and Windows™ 3.11. Access E-mail, build presentations, conduct remote access PC-to-PC sessions. It's all here.*



Shown: the ThinkPad 755CE. Available in the U.S. and Japan.**

NEW LOWER PRICES!

THINKPAD 755CSE

Dual scan color. Featuring the integrated Mwave Digital Signal Processor (DSP) with voice, fax and data capability

For more performance

- Intel 486DX4/100MHz processor
- 8MB RAM (expandable to 40MB)
- 340MB[1] HD (upgradable to 810MB)

Better communications

- Integrated Mwave DSP subsystem provides:
  – 14.4 data/fax modem
  – Mwave telephony includes telephone, full duplex speakerphone, answering machine
  – Full function audio support
- Microphone/headphone jacks/integrated speaker
- Infrared communications

Convenient to operate

- Weighs about 6.4 pounds*
- Battery life approx.: 3.3-10 hrs.++
- New TrackPoint III

$4099

IBM Credit Lease $144/month[2]

THINKPAD 755CE

Black matrix on array TFT color. Featuring the integrated Mwave DSP with voice, fax and data capability

For more performance

- Intel 486DX4/100MHz processor
- 8MB RAM (expandable to 40MB)
- 340MB[1] HD (upgradable to 810MB)

Better communications

- Integrated Mwave DSP subsystem provides:
  – 14.4 data/fax modem
  – Mwave telephony includes telephone, full duplex speakerphone, answering machine
  – Full function audio support
- Microphone/headphone jacks/integrated speaker
- Infrared communications

Convenient to operate

- Weighs about 6.4 pounds*
- Battery life approx.: 3.3-10 hrs.++
- New TrackPoint III

$4999

IBM Credit Lease $176/month[2]

THINKPAD 755CD

Black matrix on array TFT color. Featuring an internal, snap-out, double-speed CD-ROM, integrated multimedia and the integrated Mwave DSP

For more performance

- Intel 486DX4/100MHz processor
- 8MB RAM (expandable to 40MB)
- 540MB[1] HD (upgradable to 810MB)

Better communications

- Integrated DSP Mwave subsystem provides:
  – 14.4 data/fax modem
  – Mwave telephony includes telephone, full duplex speakerphone, answering machine
  – Full function audio support
- Microphone/headphone jacks/stereo speakers
- Infrared communications

Convenient to operate

- Weighs about 7.3 pounds*
- Battery life approx.: 3-9 hrs.++
- New TrackPoint III

$6349

IBM Credit Lease $223/month[2]

STANDARD ON EVERY THINKPAD 755 NOTEBOOK

- Features a 10.4" (measured diagonally) screen
- Local bus video with 1MB video memory
- Math coprocessor
- 16KB internal cache
- 3-year warranty with International Warranty Service*
- 24-hour toll-free voice support with IBM Online Housecall and ThinkPad EasyServ™‡ during warranty
- Personalized nameplate
- Hundreds of dollars worth of preloaded business software
- Advanced power management features
- PCMCIA support for one Type III or two Type II or Type I devices
- 3.5" 1.44MB diskette drive
- Rechargeable NiMH battery and AC adapter

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1 800 426·7255

enter source code 4966.

New! LaserJet 5P/5MP

The Fifth Dimension in Printing

Is your old LaserJet starting to look a little pale in comparison to the impressive new laser printers that have been flooding the market? Have you been holding back on your upgrade, waiting for something new from Hewlett-Packard? Your wait is over, and it was worth it. HP has cut the ribbon on the first of its "5" line of printers with the LaserJet 5P and LaserJet 5MP printers.

Replacing the LaserJet 4P and LaserJet 4MP, the LaserJet 5P and LaserJet 5MP offer some sexy features over their predecessors at prices that are $100 less, respectively. But the best part about the new LaserJets is that you get the same high-quality 600-dpi output from engines that print at up to 6 ppm instead of 4 ppm.

The distinction between the LaserJet 5P and LaserJet 5MP models is the same as it is for all HP printers: The model with the *M* ships with 3MB of RAM and built-in PostScript and Macintosh support, in addition to PCL5e. The *P* model, on the other hand, ships with less RAM (2MB) and support for only PCL5e.

Plug and Go Setting up a laser printer can't get much easier than HP has made it with the LaserJet 5P. Software installation was a breeze, and HP includes volumes of online tips and help information.

In addition, the LaserJet 5P ships with FontSmart, a utility that takes some of the drudgery out of font management. FontSmart lets you quickly see the name and an example of each font that's installed on your system, as well as any fonts available for installation. You can also easily delete fonts from your system, a process that's tedious in Windows.

The LaserJet 5P sports a newer and simpler front-panel control system. Gone are the LCD readouts and numerous buttons for reset and paper feed. Instead you have a series of status lights, and the more detailed controls are adjusted through the software.

Need to run the printer on a network? For several hundred dollars more, you can purchase one of HP's JetDirect cards to plug into your LaserJet 5P. This card will outfit you for network printing from a variety of protocols.

Looking Good The output of the LaserJet 5P is hard to beat. Blacks are rich and deep (more so in PostScript mode than in PCL5e mode), text is sharp and crisp, and detail in photographic images is impeccable. The gradients, however, could stand to be a little smoother—for example, we preferred the white-to-black gradient on the Brother HL-660 (another 600-dpi printer).

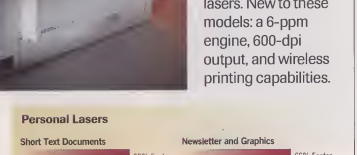
If you have a LaserJet 4P already, you'll be hard pressed to find any noticable differences in the LaserJet 5P's handling of images. Photographic output shows a bit more detail now, but the difference is not dramatic. Text, blacks, fine lines, and gradients appear nearly identical on both generations of printers.

Although the LaserJet 5P has an engine that's 2 ppm faster than the LaserJet 4P, we were unimpressed with its output speed. While the LaserJet 5MP we tested was 42 percent faster than the LaserJet 4P for processing a 50-page document, it was actually slower at processing short print jobs. On

OVERVIEW The Ultimate Personal Laser

Fifth Generation: HP's LaserJet 5P and LaserJet 5MP printers are ideal small-office and personal desktop lasers. New to these models: a 6-ppm engine, 600-dpi output, and wireless printing capabilities.

Slow but Sure: Despite its 6-ppm engine, the LaserJet 5MP didn't outrun the 4-ppm LaserJet 4P. It also performed slower than the 6-ppm Brother HL-660 in our tests.



NOTE: LASERJET 5MP WAS TESTED USING PCL5E, NOT POSTSCRIPT

Guide to the Ratings: ★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

PHOTOGRAPHS BY ARNOLD TOSETO

USABILITY: *Simple hardware setup, great software drivers, and lots of online help. It doesn't get much easier.* ★★★★½

PERFORMANCE: *Slower than we expected from a 6-ppm laser, but more than adequate for most personal printing needs.* ★★★½

TECHNOLOGY: *Who needs cables? The LaserJet 5P is the first printer to support wireless printing via an infrared port.* ★★★★★

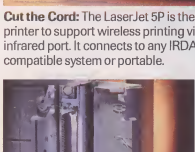
VERDICT: *Cutting-edge technology, superb output, and a great price—it sets the standard for personal lasers.* ★★★★½

GUIDED TOUR

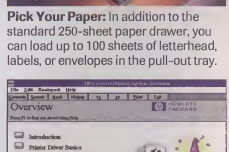
A LOOK **INSIDE** THE LASERJET 5P/5MP

Cut the Cord: The LaserJet 5P is the first printer to support wireless printing via an infrared port. It connects to any IRDA-compatible system or portable.

Pick Your Paper: In addition to the standard 250-sheet paper drawer, you can load up to 100 sheets of letterhead, labels, or envelopes in the pull-out tray.



Two Ways to Connect: You'll find two bidirectional parallel ports on the LaserJet 5P. These ports make it simple to connect more than one user to the printer.



Look and Learn: The LaserJet 5P offers help up front—before you've had a problem. Browse through the overview, and it will answer your basic questions about the printer or drivers and even offer some troubleshooting tips.

FILEBOX

LaserJet 5P/5MP

Competition: The $699 Brother HL-660 costs a bit less and also has 6-ppm engine at 600 dpi, but its output isn't quite as sharp. It also lacks the infrared wireless port and the usability touches of the LaserJet 5P.

Features (as tested): 3MB of RAM, PCL5e, PostScript Level 2, 20MHz RISC processor, two IEEE-compliant B-type and C-type parallel ports, IRDA-2 compliant infrared port.

Paper Handling: 250-sheet tray, 100-sheet multipurpose tray for envelopes and labels.

Resolution: 600 dpi.

Cost per Page: Less than 2 cents per page.

$900 est. street price for the LaserJet 5P; $1,000 for the LaserJet 5MP
Hewlett-Packard
(800) 752-0900
Reader Service No. 661

a graphics document such as a newsletter, however, the two printers clocked speeds that were nearly identical.

Beam It to the Printer

The most unique feature on the LaserJet 5P is an infrared (IR) port that supports wireless printing. This is the first printer to offer this technology built in, and we guarantee that it won't be the last.

Of course, to take advantage of wireless printing you need a device with an infrared port, such as an IR-equipped notebook. If you have an HP OmniBook 4000CT, Gateway Liberty, DEC HiNote, or IBM ThinkPad, you're in business.

Configuring the LaserJet 5P for IR printing is simple: Just install the appropriate drivers on your portable device, then point and print. (Depending on what portable you're using, you may need to wrestle with IRQ settings.) Beaming a job to the printer proved no slower than a cable connection, yet it's more convenient.

Still, there are some wireless improvements we'd like to see. For example, you need to be within three feet of your printer to use the IR port, which is actually a shorter distance than most parallel cables.

Even so, there's little not to like about the LaserJet 5P. Setup and usability are terrific, and the output is first-rate. Its output speed lags slightly behind the competition, but it's more than adequate for a small office or for home use. If you're in search of a high-quality, reliable laser printer, you'll be hard pressed to find one that's better than the LaserJet 5P or the LaserJet 5MP. **KYLA K. CARLSON**

Guide to the Ratings

In each applicable area—usability, performance, technology, and verdict—we award a product from one to five stars. In some cases, other factors (such as price) also affect our verdict.

★★★★★ **Excellent** A market leader that offers exceptional performance.

★★★★ **Good** Excels in a few areas; a good buy, though not perfect.

★★★ **Acceptable** Average for its class; a justifiable purchase.

★★ **Poor** Out-of-date or substandard, possibly offset by some positive features.

★ **Unacceptable** Missing necessary features or suffering from subpar implementation; avoid.

A product with one of the highest *"You're kidding me"* scores ever recorded.

The reaction is almost always the same: you tell someone about this new watch that can read your personal schedule right off a computer screen, and they look shocked for a moment, then shake their heads. "No, c'mon," they protest, "what does it *really* do?"

Well, it's the honest truth. All you need is a Timex Data Link watch and the included software, a PC loaded with Microsoft® Windows™ 3.1 or later, and a CRT monitor. Then just push a few buttons, and hold the watch in front of your monitor. The screen will flash lines of light, and in seconds the watch's electronic eye will read up to 70 entries from the Microsoft and Timex Data Link software: appointments, phone numbers, alarms, to-do lists, birthdays, anniversaries, even locker combinations.

The Timex Data Link watch: it's like science fiction, but without the fiction.

Presto, everything is now right there in your watch, as portable as the arm you wear it on.

A week before a birthday or anniversary, a little hand with a string around the forefinger appears on the watch face (*Get outta here!*– no, really, it does) as a reminder icon. Then on the actual day itself, the icon flashes urgently. Or when an appointment nears, the watch beeps to alert you, then tells you who you're supposed to meet, and where.

If this all seems a bit much to believe, we encourage you to examine this remarkable watch with your own eyes, or call 1-800-367-8463 for information. You'll see that everything we've told you is true. Seriously. No lie. Scout's honor. No kidding.

The Timex Data Link watch can actually read your personal information right from your computer screen.

The Indiglo night-light makes sure you're never left in the dark.

TIMEX DATA LINK

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Circle 108 on reader service card.

Plextor 6Plex

The Fastest CD-ROM Drive Ever

USABILITY: *So easy to install you'll be spinning discs in minutes; external buttons ease audio-CD control.* ★★★★

PERFORMANCE: *200 percent faster than a dual-speed drive, thanks to a 3,300-rpm platter.* ★★★★★

TECHNOLOGY: *6X speed ups the CD-ROM ante, souped-up drivers add punch.* ★★★★★

VERDICT: *The fastest CD-ROM drive you can buy; we can't wait for the multi-disc jukebox version.* ★★★★★

SNEAK PREVIEW

It's faster than a speeding AVI file, more powerful than a database query engine, able to access large chunks of data in a single bound . . . Plextor's new six-speed CD-ROM drive is the fastest drive we've ever seen and guaranteed to leave all others in the dust. The first of the next generation of CD-ROM drives, the Plextor 6Plex offers sustained throughput rates of 900Kbps—50 percent faster than its quad-speed sibling, the 4Plex 256, and any offerings from the competition.

Optimal Performance

Plextor ships the drive with either a BusLogic or Adaptec SCSI card and all the necessary installation software. Because BusLogic is a bus-mastering SCSI card, it offers the better performance of the two. Plextor has also added its own optimized drivers (for Windows and DOS) that reduce the work for your system's processor. In fact, with the drivers in place, the Plextor 6Plex monopolizes less of your system's CPU time than any quad-speed drive we've tested. This frees your system for other tasks and better overall system performance.

When it comes to CD-ROM performance, throughput and access time are key. In our tests, the Plextor 6Plex returned a throughput of 910,568 bits per second and an average access time of 160 ms. Both scores slay the competition.

While other competitors will undoubtedly emerge before too long, Plextor can offer this peerless performance today by ramping up the drive's platter speed to 3,300 rpm and adding a more powerful motor to coordinate the read head.

Faster throughput means that the CD-ROM drive grabs data on a disc and delivers it back to the PC faster. This can help smooth out choppy video, for example, or synchronize the audio and video playback. The faster access time will benefit anyone who works with large amounts of data or with data that's spread out randomly across a disc. The pages in any encyclopedia CD-ROM snap instantly to your screen when running on the Plextor 6Plex.

Sound Additions Plextor's complete redesign of the drive includes a new exterior and more features, including audio-CD controls. If you have headphones or a sound card, you can pop in your favorite album and use the Plextor 6Plex just like your portable or home CD player. The dual-function buttons—one for play and track forward, and the other for stop and eject—are clearly labeled. These buttons stand out from the front of the case so that you can control audio-CD operations without having to look away from whatever you're doing. You'll also find a headphone jack and volume controls on the Plextor 6Plex.

Best of all, you won't pay dearly for all these extras. With a street price of just $550, the Plextor 6Plex will not only drive down the cost of quad-speed drives already on the market, it's a bargain in its own right. BENJAMIN F. MILLER

6X Breakthrough: The Plextor 6Plex six-speed CD-ROM drive is the first to challenge the now-standard quad-speed drives. Not only does it serve up data files faster but it plays back video smoother as well. Enhancements to Plextor's design include external audio and headphone jacks and enhanced drivers.

Warp Speed: Not surprisingly, the Plextor 6Plex is 50 percent faster than its quad-speed sibling. It also monopolizes less of your system CPU's time.

FILEBOX

Plextor 6Plex

Competition: No other six-speed CD-ROM drives are available yet, though competitors loom; quad-speed drives are the closest performers.

Features (as tested): BusLogic bus-mastering SCSI adapter, installation software, optimized proprietary driver software.

Options: Your choice of BusLogic or Adaptec SCSI adapter.

$550 est. street price
Plextor Corp.
(800) 753-9857, (408) 980-1838
Reader Service No. 662

PHOTOGRAPHS BY ARNOLD TSEKLO

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Getting Ahead in the Paper Chase

USABILITY: *Intuitive—and invisible—hardware and software.* ★★★★★
TECHNOLOGY: *Seamless integration with most communications and document management packages.* ★★★★
VERDICT: *A straightforward and low-cost way to organize your way out of paper chaos.* ★★★★★

SNEAK PREVIEW

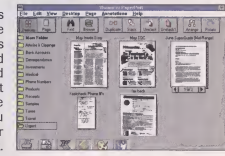
If your in-box has taken over your desk, and you'd like to turn all incoming printed memos, faxes, and clippings into a more manageable digital format, Visioneer's PaperPort scanner and document-filing software can cut through the clutter.

The PaperPort hardware is a petite 400-dpi sheet-fed scanner that tucks neatly between your keyboard and monitor. Installation via the serial port is instant and cardless, making it easy to switch between a desktop machine or a notebook (or even a Mac with the proper cable). The software is almost as invisible and innocuous as the hardware. Slide the paper into the scanner and the unit automatically turns itself on, pulls in the page, and launches the PaperPort software.

Paperless Folders Once the software is launched, you simply have to name your document, tag it with a few keywords, drag it into a folder, and you're done—all in just a few seconds. The PaperPort also links to most popular e-mail, fax, OCR, and document management packages. The software automatically locates any compatible programs you have and adds their icons to its toolbar, along with a printer icon. By dragging and dropping the scanned document image over the printer icon, you can also use PaperPort as a convenient personal photocopier (though you can't copy bound or oversized materials this way).

Faxing or e-mailing a document is just as simple: Drag the scanned page over the fax or e-mail icon and the appropriate software launches, prompting you for the recipient's name or fax number and other details.

Paper Floppy Drive: The hardware half of the PaperPort is a 400-dpi sheet-fed scanner that attaches via a serial port. Slide a document into the scanner, and it automatically pulls the paper through and launches the software.



A Paradigm of Usability: Visioneer's PaperPort scanner and software combination lets you turn paper pages into electronic documents simply and seamlessly. Thumbnail icons of scanned documents appear on the PaperPort desktop; drag and drop scans onto the proper application's icon, and you can edit, file, e-mail, or fax them—or use OCR to convert them into text.

New to this version of the software are folders for sorting files and tools for annotating documents. Visioneer has also boosted the scan resolution to a sharper 400 dpi. The software can filter out stray pixels and straighten scans, and it's easy to delete unneeded portions of images—handy if you're scanning newspaper clippings that include pieces of unrelated articles. Since each scan requires between 10K and 100K of disk space, you'll want to save only the relevant parts of images.

Drag-and-Drop OCR Translating your scanned documents into editable text files is a breeze. A lite version of Caere's WordScan OCR software is included with the scanner, or you can use your own PaperPort-compatible OCR software. Just drag and drop a scanned file over the OCR icon and follow the prompts. If you're satisfied with the conversion results, you can delete the scanned image and store the more compact text file.

Visioneer has added enough features and compatibility with industry-standard document and communication packages to make this version a big step forward—without compromising the MVP Award–winning usability of its first release. Although the version we tested had a few minor bugs—it's not very graceful about working in the background if you switch to another application while it's scanning, for example—the PaperPort is an ideal low-cost solution for taming the paper tiger. JON ZILBER

FILEBOX

PaperPort

Features: Auto-on scanning; bundled WordScan OCR software; links to fax, e-mail, and document management software; cardless installation; 10K to 100K per scanned document.

Scanner: 400-dpi grayscale, sheet fed, serial connector; accepts sheets up to 8.5 inches wide and 30 inches long.

System Requirements: Windows 3.1, 4MB of RAM.

$369 est. street price
Visioneer Communications
(800) 787-7007, (415) 493-9599
Reader Service No. 663

PHOTOGRAPH BY ARNOLD TSOEJD

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

For 1200 dpi printing,
there's really only
one choice.
There are, however,
several options.

The new Optra family
from Lexmark.

At Lexmark, we don't limit top-of-the-line features to our top-of-the-line printers.

The new Optra™ family is the first full line of network-ready, desktop laser printers capable of true 1200 x 1200 dpi* printing. Each Optra laser printer, from the extremely affordable 12 ppm Optra R to the extremely powerful 16 ppm Optra Lxi, delivers four times the sharpness of ordinary 600 dpi printers.

yes It runs with NetWare

No matter which option you choose, our break-through MarkVision™ printer utility is standard. Users and LAN managers can control and configure every Optra on the network, and monitor job statistics, right from Windows™ or Macintosh workstations.

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All this value and innovation from Lexmark, a former division of IBM. For more information, call us at **1 800 891-0399, ext. 34.**

Thanks to the new Optra family, you can choose the best printer, rather than the best compromise.

LEXMARK™

ADVANCING THE ART OF PRINTING

*1200 dpi requires additional memory for complex files. Lexmark products are manufactured under the ISO 9002 approved quality process. The Energy Star emblem does not represent EPA endorsement of any product or service. Lexmark, Optra and MarkVision are trademarks of Lexmark International, Inc. NetWare is a registered trademark of Novell, Inc. Windows is a trademark of Microsoft Corporation. Macintosh is a registered trademark of Apple Computer, Inc. PostScript is a trademark of Adobe Systems Incorporated, which may be registered in certain jurisdictions. PCL is a registered trademark of Hewlett-Packard Company. © 1996 Lexmark International, Inc

Circle 162 on reader service card.

New! HARDWARE: Zip drive

Add Zip to Your Expandable Storage

USABILITY: *So easy to set up you'll think there's a catch (there isn't).* ★★★★½
PERFORMANCE: *One of the fastest portable storage options.* ★★★★
TECHNOLOGY: *Hard-drive capacity meets floppy portability and cost.* ★★★★½
VERDICT: *If you have data, you need one.* ★★★★½

Paperback Storage: Iomega's $200 Zip drive combines the portability and low cost of a floppy diskette with the capacity and speed of a hard drive. Cartridges for the Zip drive come in 25MB and 100MB capacities at $10 and $20, respectively.

Floppies are tedious, tape's a pain, and hard drives still cost too much to upgrade on a whim. But no matter what you do, files multiply exponentially on your hard drive. The worst part is that all of the files are important. So what can you do? Put them on an Iomega Zip drive, of course.

The Zip drive is one of the most innovative storage ideas to come along in years. By combining the inexpensive media type from floppy drives and the read/write heads commonly used in hard drives, the Zip drive delivers 100MB of storage space in a cartridge only a little larger and thicker than a 3.5-inch floppy.

Best of Both Worlds But here's the really clever part: The Zip drive, including one 100MB cartridge, costs less than $200. Additional 100MB cartridges cost just $25 each. Whereas stashing files on a hard drive costs about 50 cents per megabyte, stashing them on a Zip drive costs less than 20 cents per megabyte.

There are several Zip tools included with the drive that make it more than just a new place for shoveling your files. There's a Move utility, which transfers those seldom-used applications that clutter your system to the Zip cartridge with a few mouse clicks. Then you can access them off your Zip drive. The Copy Machine utility takes those stacks of floppies and consolidates them onto a Zip disk for you. And there's also the Catalog utility that helps you track where you've moved and archived files so that you can find them again easily.

It's Portable, Too Zip cartridges are as easy to transport as floppies, but the drive travels easily as well. Weighing just over a pound and no larger than a small paperback book, it slips into a briefcase for travel between home and office or for transporting large files on the road. The only drawback of toting the Zip drive around is it's bulky AC adapter, which takes up almost as much room as the drive itself.

Two Ways to Zip The Zip drive comes in two flavors: SCSI and parallel. The SCSI version is the faster of the two and works on both PCs and Macintoshes. It also comes with its own SCSI controller card and extra software drivers—handy for sharing a SCSI connection with a CD-ROM drive. The parallel version of the drive is slower than the the SCSI version, but it attaches easily to any parallel port (including the newer high-speed enhanced parallel port found on most portable and desktop PCs) and makes it easy to shuttle the drive between several systems.

The Zip drive is not only more affordable than traditional removable storage solutions such as magneto-optical drives, it's also faster. Syquest drives, by comparison, have the same capacity, but they cost more than Zip drives, are slower, and their disks have twice the per-megabyte cost. Whether you're looking for an affordable and easy way to archive old files or an efficient and secure way to transport large data files, the Zip drive is the best portable storage option around. SCOTT NAYLOR

Two Ways to Stash: The Zip drive comes in both parallel and SCSI versions. The SCSI version is the fastest and delivers data at a rate of up to 60MB per minute. The parallel port version is limited by the slower speed of the parallel port, with a transfer rate of up to 20MB per minute. While neither version is as fast as a hard drive, their performance is snappier (and more convenient) than diskettes and far better than other portable solutions like a Syquest drive.

Hard Drive to Go

NOTE: DATA PERFORMANCE SCORES ARE BASED ON SEVERAL DATA TRANSFER TESTS.

FILEBOX

Zip drive

Competition: Magneto-optical drives and Sony's rewritable optical MD Data MiniDisc have about the same capacity at the same per-megabyte cost but are pricier and slower. Syquest drives have twice the per-megabyte cost, the same capacity, and cost more.

Options: SCSI or parallel connector.

$199 est. street price (SCSI or parallel), $20 per 100MB cartridge, $10 per 25MB cartridge
Iomega
(800) 697-8833
Reader Service No. 664

PHOTOGRAPH BY ARNOLD TOSKE/D

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

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#1

Market Share Windows Illustration Software
PC Data, December Sales, 1994

CorelDRAW
NUMBER ONE in ILLUSTRATION

Company	Units	Sales
Corel	7609	1,586,519.83
Adobe	257	73,968.64
Micrografx	380	36,696.38
Deneba	98	15,899.24
Totals	8,344	1,713,083.90

The results are in!

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#1

Corel VENTURA*
NUMBER ONE in PUBLISHING

Product	S.L.P (US$)	Score
Corel VENTURA 5	$595	6.8
QuarkXPress	$895	6.7
Aldus PageMaker	$895	6.2

3.5" disk version

INFOWORLD
Report Card Rating,
Desktop Publishing Software
March 20, 1995

#1

Corel PHOTO-PAINT*
NUMBER ONE in IMAGE-EDITING

Product	S.L.P (US$)	Overall weighted score
Corel PHOTO-PAINT 5 Plus	$249	44
Micrografx Picture Publisher 5.0	$595	42
Adobe Photoshop 3.0	$895	39
Fractal Design Painter 3	$499	38

3.5" disk version

PC World,
Best Buy Award,
April, 1995

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Document: #1071

*Available as standalone products.

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KIR-0713

Circle 230 on reader service card.

Roaring 120MHz Pentium Duo

Hail to the lions of summer: With the unleashing of their first-generation 120MHz Pentium systems, Micron and Polywell now join Gateway (see "Tomorrow's PC? 120MHz and Loaded," May, page 62) in offering the most powerful x86 machines money can buy.

Micron's P120 Millennia and Polywell's Poly 120T1 are remarkably similar in features, design, and performance. Each comes with 16MB of EDO RAM supported by Intel's Triton chipset, a 256K L-2 cache, a 1.275GB Enhanced IDE hard drive, and Diamond's 64-bit PCI Stealth video accelerator. Each also has a caddyless quad-speed CD-ROM drive and 16-bit Sound Blaster–compatible audio card.

Open the covers of these drives and more similarities abound. Both machines position a fan on top of the CPU and a large multipronged heat sink adjacent to the chip to help the Pentium keep its cool. Both feature four ISA and four PCI slots. And both come in handsome minitower cases, which leaves no doubt that their power is designed for next-generation business apps, not for servers.

Front Runners Technically the P120 Millennia can now claim to be the fastest x86 PC in the world. But its performance was just 1 percent faster than the Gateway P5-120 and only 4 percent faster than the Poly 120T1 in our Windows benchmark tests. In other words, performance on the three systems is virtually identical. And needless to say, it's breathtakingly fast.

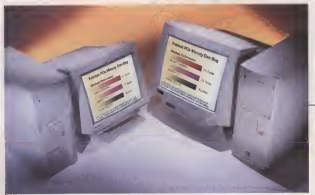
Do these peas in a pod differ at all? Only in the details: The P120 Millennia's CD-ROM drive uses an IDE interface rather than the traditional SCSI connection used by the Poly 120T1. In fact, the P120 Millennia can support up to four IDE devices, two of which will run on local bus. Its memory is expandable to 128MB, while the Poly 120T1 can be upgraded to as much as 192MB. And the P120 Millennia's RAM SIMMs are easily accessible for upgrades—a usability advantage that Polywell's system can't claim.

Kings of the Jungle? These subtle advantages give the P120 Millennia a slight edge over the Poly 120T1 in performance and technology. But the machine's biggest advantage is its price: $3,799, which is about $700 less than the Poly 120T1 (though the Polywell comes with a 17-inch monitor that we liked far better than the P120 Millennia's 15-inch screen).

The P120 Millennia's real competitor is the $4,299 Gateway P5-120. Like the Poly 120T1, it comes with a 17-inch monitor. But the Gateway P5-120 also packs a three-disc quad-speed CD-ROM drive and a 28.8Kbps fax modem. Since all three machines deliver virtually identical performance, the choice comes down to the Gateway P5-120's extra amenities or the lower price of the P120 Millennia.

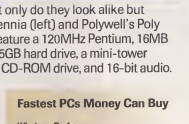
The pricing of these systems will be subject to tumultuous change in the coming months. However you look at it, the price of power is very alluring indeed.

MARTY JEROME



Peas in a Pod: Not only do they look alike but Micron's P120 Millennia (left) and Polywell's Poly 120T1 (right) both feature a 120MHz Pentium, 16MB of EDO RAM, a 1.275GB hard drive, a mini-tower case, a quad-speed CD-ROM drive, and 16-bit audio.

Let 'em Roar: Strictly speaking, the P120 Millennia takes the crown as the fastest, but it's practically indistinguishable from the Gateway P5-120 and the Poly 120T1.



NOTE: WINSTONE 95 IS A BENCHMARK THAT RUNS 13 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS.

P120 Millennia

USABILITY: *Easy to upgrade, but where's our CD changer?* ★★★★

PERFORMANCE: *Yes, it's the fastest PC in the world . . . by half a hair.* ★★★★★

TECHNOLOGY: *EDO RAM and IDE peripherals are cutting-edge.* ★★★★½

VERDICT: *Its price and technology beat Polywell's Poly 120T1, but don't overlook the Gateway P5-120.* ★★★★

Poly 120T1

USABILITY: *No PS/2 mouse port and unreachable RAM? Please . . .* ★★★

PERFORMANCE: *Identical to the Millennia and the Gateway P5-210.* ★★★★★

TECHNOLOGY: *Motherboard components and EDO RAM are state-of-the-art, but everything else could use some work.* ★★★½

VERDICT: *We like the big 17-inch display, but would like a smaller price tag even more.* ★★★½

FILEBOX

P120 Millennia

Features (as tested): 16MB of RAM, 1.3GB hard drive, quad-speed CD-ROM drive, 16-bit audio, 15-inch monitor.

$3,799 est. street price
Micron Computer
(800) 515-9197
Reader Service No. 665

Poly 120T1

Features (as tested): 16MB of RAM, 1.3GB hard drive, quad-speed CD-ROM drive, 16-bit audio, 17-inch monitor.

$4,500 est. street price
Polywell Computers
(800) 999-1278
Reader Service No. 666

PHOTOGRAPH BY ARNOLD TOSELLI

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Alexandre Patty had a rather distinctive approach to descending a staircase. Since he obviously preferred doing things the hard way, he probably wouldn't have been interested in faxing with Delrina WinFax PRO.

Given the choice between using an elevator or your head to go down a flight of stairs, you'd probably opt for the easier way, right? So if you're not already faxing with the award-winning WinFax™ PRO 4.0 fax software, you should be. Because it is, quite simply, the easiest and most convenient way to send and receive faxes. By faxing with your PC, you'll save countless trips walking to the fax machine. And WinFax PRO makes sending a fax from within any Windows application as easy as printing a document.

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DELRINA

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Circle 167 on reader service card.

New! HARDWARE: magicolor LX

A New Day for Color Laser

USABILITY: *Software drivers need to be more user friendly.* **½

PERFORMANCE: *Won't keep you waiting, but speeds are only middling.* ***

TECHNOLOGY: *High-quality color, capable of 600-dpi color output.* ****½

VERDICT: *Your basic color laser with a stunningly low price.* ****

Rumor has it that 1995 is the year of the color laser printer. Wouldn't that be nice. Fast black text printing, high-quality plain-paper color when you need it, low cost per page . . . the only drawback is the price of the printer. Or is it? Enter QMS's magicolor LX: $4,999 of solid color laser technology in one (very large) box.

It sounds too good to be true. For the sub-$5,000 price, you get 12MB of RAM, PostScript Level 2, 600-dpi monochrome black output, 300-dpi color output (which you can jack up to 600 dpi by adding an extra 12MB of RAM), and QMS's Crown multitasking technology. Do you need network support? CrownNet Ethernet and Token Ring network interfaces are also available for an additional $999 each.

Setup Saga The hardware setup of the magicolor LX is no different from earlier QMS models or from the Xerox 4900 Color Laser Printer (see "Color Laser Showdown," November 1994, page 54). There are more parts to install and more time is required than with Hewlett-Packard's Color LaserJet or Tektronix's Phaser 540. This is because you need to install a separate drum unit and toner cartridge for each color, in addition to several other elements. Even so, hardware setup is quite simple.

Software setup, on the other hand, is tedious. Compared to other players in the market, QMS's drivers fall behind on the ease-of-use curve. We'd like to see more user-friendly drivers that take care of some of the necessary processes for you.

Color laser printers are the fastest way to produce color pages, and while the magicolor LX churned out pages rather quickly, we weren't impressed with the numbers. Despite an engine speed of up to 12 ppm for black text, in our tests the magicolor LX printed text 35 percent slower than Lexmark's Optra R, which is a 12-ppm monochrome printer.

For color output, the magicolor LX, with reported speeds of 3 to 6 ppm, printed 60 percent slower than Tektronix's Phaser 340. While the Phaser 340 is a solid-ink printer, not a laser, its reported engine speed is a little slower at 4 ppm.

If Looks Could Kill The magicolor LX will stand behind you when you really need to look good. We were impressed with its output, specifically for graphics and presentations. Solid presentation backgrounds were fairly smooth and consistent, and the color contrasts were, in a word, stunning. Color and monochrome gradients were also very smooth and subtle, as they should be.

We noticed that there was a bit of fuzz around the magicolor LX's text output, which caused it to look a little dull and not as crisp as we would prefer. However, photographic images looked good, whereas Tektronix's Phaser 540 has the other color lasers beat there.

But the real selling point on the magicolor LX is price. Sure, its speeds aren't the best, and the drivers aren't as friendly as they could be, but for $4,999, those are nits. If you need high-quality plain-paper color output, the magicolor LX will serve you just fine. KYLA K. CARLSON

Color Comes Cheaply: QMS's magicolor LX is the cheapest color laser printer you can find today. Shattering price barriers, it offers 600-dpi monochrome printing, and with a memory boost, the magicolor LX is capable of producing 600-dpi color printouts.

Smooth Shades: The output from the magicolor LX is pleasing. The colors are vibrant, smooth, and look great no matter what kind of paper you're printing on. Using plain paper keeps per-page costs down. Apart from speed, this is one of the biggest advantages color laser printers have over other color printing technologies.

PHOTOGRAPH BY ARNOLD TIOSEJO

FILEBOX

magicolor LX

Competition: HP's Color LaserJet, the Xerox 4900 Color Laser Printer, and Tektronix's Phaser 540—none of which can compete when it comes to price.

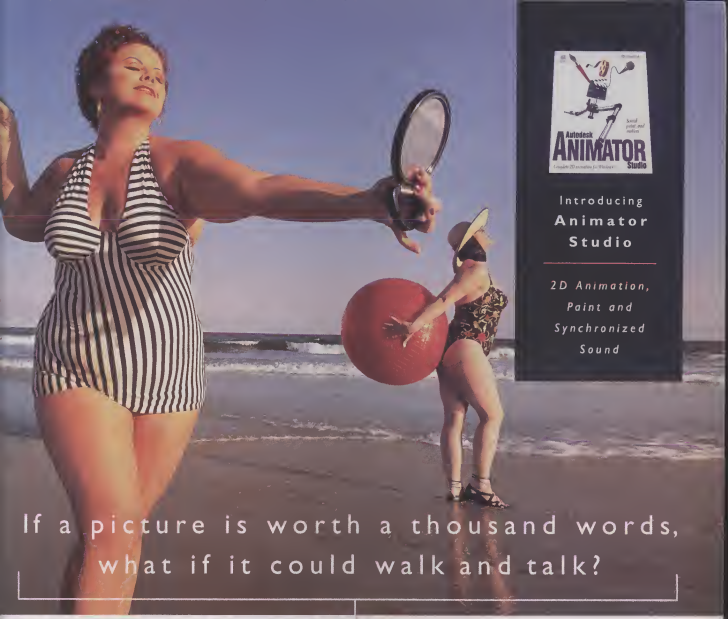
Configuration (as tested): 32MB of RAM, Adobe PostScript Level 2.

Resolution: 600-dpi black, 300-dpi color (600-dpi color with 24MB of RAM).

Cost per Page: 18 cents (with 15 percent color).

$4,999 est. street price
QMS
(800) 523-2696, (205) 633-4300
Reader Service No. 667

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*



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IBM PC Server 320:
Intel 90MHz Pentium processor, multiprocessor enabled, EISA/PCI, 16MB parity memory expandable to 256MB, ECC on SIMM optional, 256KB of L2 cache, SCSI-2 fast and wide, 6 open slots, 9 bays, standard CD-ROM.

IBM PC Server 500:
Intel 90MHz Pentium processor, MCA, 32MB ECC memory expandable to 256MB, 256KB of L2 cache, SCSI-2 fast and wide, 6 open slots, 18 bays for hot-swappable drives, RAID-0, 1, 5 enabled, standard CD-ROM.

IBM PC Server 720:
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Sound and Speed for the Road

Better get used to that music coming from across the airplane aisle. Integrated 16-bit audio is now standard fare in any high-end notebook PC. And judging from two top-drawer offerings from Hewlett-Packard and Gateway, so are a lot of other features that would have cost extra only a year ago.

HP's OmniBook 4000CT and Gateway's ColorBook² both come with removable hard drives with capacities as large as 520MB and 720MB, respectively. And both notebooks feature either a 50MHz DX2 or 100MHz DX4 CPU with accelerated video running on 32-bit local bus.

In other words, either one of these machines will give you more than enough storage and processing power for multimedia presentations, professional graphics applications, and gigantic spreadsheets.

Tote Me But the OmniBook 4000CT takes the prize, thanks to a gorgeous 10.4-inch active-matrix color display that offers 64,000 colors at 640 by 480 resolution (a dual-scan passive-matrix version is available as well). The floppy drive is removable so that you can swap it out with a second battery, and as with all HP systems, this notebook features an IRDA-compatible bidirectional infrared port.

Is something missing? Not where usability is concerned. A large center-mounted trackball is situated on the OmniBook 4000CT's ample wrist rest, which also holds two stereo speakers. Sound quality is good enough to distinguish voice-overs on musical backgrounds. An LED display for system status will shame other notebooks that haven't adopted this feature yet.

The lithe and feathery ColorBook² is also packed with features, even if it does lack the elegance of the OmniBook 4000CT. The newest version of Gateway's top-deck portable not only adds 16-bit Sound Blaster–compatible audio but faster video as well, thanks to a 512K video cache and 1MB of video RAM.

Catching Pentiums If you have any doubts about how this performance adds up, the ColorBook² only marginally trailed NEC's 75MHz Pentium Versa in our benchmark tests. It's the fastest 100MHz DX4 we've seen.

The ColorBook²'s usability is a mixed bag, however. The notebook comes with a 10.3-inch dual-scan passive-matrix display. Although bright with rich color saturation, the screen supports only 256 colors at 640 by 480 resolution, and its backlighting is slightly uneven. The line, speaker, and microphone jacks are well positioned, and the sound quality from the machine's single speaker is adequate. Although we prefer its TrackPoint II pointing device to the OmniBook 4000CT's trackball, the ColorBook²'s keyboard layout and key spacing don't hold a candle to the OmniBook's.

As with all Gateway products, you still get a lot for the money. A 100MHz DX4 version with 8MB of RAM and a 720MB hard drive will set you back $3,999. But unless you need blazing performance and can't afford a Pentium, get the OmniBook. MARTY JEROME

OmniBook 4000CT

USABILITY: *Sore shoulders aside, it competes with the best.* ★★★★

VERDICT: *Feature rich, shrewd design.* ★★★★½

ColorBook²

USABILITY: *Display needs work, but nice audio.* ★★★

VERDICT: *It's impressive all right, but the OmniBook is superior.* ★★★★

FILEBOX

OmniBook 4000CT

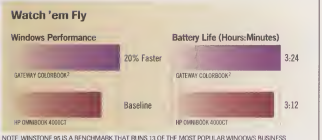
$4,099 est. street price
Hewlett Packard
(800) 443-1254
Reader Service No. 668

ColorBook²

$3,999 est. street price
Gateway 2000
(800) 846-2000
Reader Service No. 669

Different Leagues: HP's OmniBook 4000CT (right) delivers active-matrix glory and superb usability. Gateway's ColorBook² (left) is less refined but packs a lot for the dollar, including a removable 720MB hard drive, 16-bit audio, and an expansive 10.3-inch passive-matrix display.

Fastest in Their Class: Both systems turned in respectable performance numbers in our tests, and the ColorBook² was almost as fast as NEC's 75MHz Pentium Versa notebook. Battery life on the portables was adequate.



PHOTOGRAPH BY ANNCLO TIOSEJO

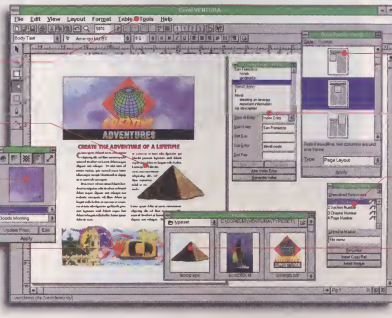
Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Corel VENTURA 5

POWER PUBLISHING!

Corel VENTURA 5 beats Aldus PageMaker and QuarkXPress.

Infoworld, Report Card Rating March 20, '95



Corel VENTURA 5 ..."unparalleled power and flexibility"...

"Corel has done some fine work in improving and recasting VENTURA into a robust page layout program with impressive capabilities."

Windows Magazine, January '95

"FrameMaker, QuarkXPress, and PageMaker can't beat the level of formatting and typographical control offered by VENTURA's paragraph-based style sheets—a boon when your document requires a complex structured format."

PC\Computing, January '95

"Corel VENTURA delivered a convincing performance. Users who are already familiar with CorelDRAW will easily get used to the DTP program. The user friendly VENTURA can be recommended even to beginners..."

PC Praxis, April '95

UPGRADE to the BEST DTP software!

"Newcomers to this desktop publishing package will find unparalleled power and flexibility in building and modifying large and complex documents."

PC Magazine, February '95

"Appropriate for documents of all lengths, VENTURA offers templates to get started quickly, better text formatting, and prepress capabilities."

Home Office Computing, January '95

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KIR-0116

Page Me, Fax Me, or Leave a Message

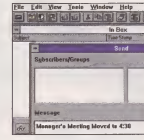
USABILITY: *Better integration of apps and a detachable beeper would help.* ★★★
TECHNOLOGY: *A full suite of mobile communications technologies on a single card.* ★★★
VERDICT: *A bridge to true wireless fax and communications.* ★★

Marry a pager to a 14.4Kbps PC Card fax modem, toss in voice-mail capability, and you'll have the ultimate mobile communications device, right? This is the thinking behind NovaLink Technologies' $349 NovaPak 144. And yes, the device delivers as promised despite its somewhat clumsy implementation.

Attached to a standard Type II PC Card, the external portion of the NovaPak pager is smaller than a box of paper clips. It features an LED display at one end and runs off a single AA battery when not drawing power from the PC it's attached to (there's also an internal manganese backup battery). This means that the NovaPak 144 continues to operate as a stand-alone pager even when the PC is powered down. But you won't want to carry it around. The PC Card isn't detachable from the pager, and the combination is too large—and delicate—for your hip or jacket pocket.

Card Pager: NovaLink slips a 14.4Kbps fax modem, voice mail capability, and even a pager in the NovaPak 144's wafer-thin Type II PC Card.

Manage Your Mail: Software utilities manage the fax, voice, and e-mail the NovaPak retrieves. WinBeep, for example, can automatically page other people on your mailing list without your intervention.



Page Me But there's no compromise in capability. The pager is fully compatible with standard alphanumeric services like PageNet, SkyTel, MobileCom, and PageMart. The base model comes with 32K of memory, though there's also a version with 128K that sells for $399. (Tip: Opt for the larger memory since it provides enough capacity for true one-way e-mail.) In many cases, the pager can deliver enough information so that you don't even have to return the phone call.

Fourth Wave's WinBeep 2.1 is also included, which not only routes messages into predefined folders but lets you set rules that act on received messages. If your assistant pages you to confirm the time and place of a meeting, for example, you can program WinBeep to automatically page other attendees with this information. Action Rules are easy to set thanks to simple Windows dialog boxes, although Rule conditions are limited to basic Boolean operators.

Hello? Besides two-way paging and 14.4Kbps data/fax capability, the NovaPak 144 provides voice mail via Smith Micro's QuickLink Message Center. At its simplest, QuickLink Message Center lets you record your own outgoing message and stores incoming voice messages compressed on your hard drive.

The problem: How do you record or review messages if your portable has no built-in speaker or microphone? A routine called VoiceMail Assistant lets you dial a third-party number that reads the voice messages off your portable and plays them back to you over the phone. It's a bit kludgy, but it works as advertised.

Otherwise, QuickLink Message Center provides for fairly sophisticated mailbox management, including a crude but workable fax-back facility. In fact, the software that comes with the NovaPak 144 is worth the cost of the device alone. In the upgrade, however, we'd like to see both applets fuse into a single program that incorporates the smart agents WinBeep now uses in its network product. And we'd applaud being able to detach the pager from the PC Card to avoid damaging the card by carrying it around.

While some of the newest notebooks—such as those in IBM's ThinkPad series—now integrate telephony features into the motherboard, most older notebooks lack these advanced features. And even the latest ThinkPad lacks smart paging, which in recent years has become a rudimentary form of wireless e-mail. The NovaPak 144 conveniently consolidates a diverse array of mobile communications technologies, and its intelligent two-way paging provides a practical bridge into a wireless world. **MARTY JEROME**

FILEBOX

NovaPak 144

Competition: None.

Features (as tested): 14.4Kbps data/fax modem with paging and voice-mail capabilities, 32K of memory (expandable to 128K); bundled with FourthWave's WinBeep 2.1 and Smith Micro's QuickLink Message Center; compatible with PageNet, SkyTel, MobileCom, and PageMart paging services.

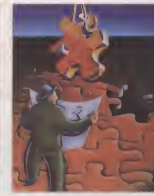
System Requirements: One Type II PC Card slot.

$349 est. street price
NovaLink Technologies
(800) 668-2546
Reader Service No. 670

PHOTOGRAPH BY ARNOLD TSEKLIS

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Network utilities—vital, but set aside 100K



DOS 6 utilities—handy, but about 120K

Multimedia—fun, but can you spare 50-80K?

Internet utilities—where will you get 120K?

If you don't have QEMM 7.5, what else have you sacrificed?

Sooner or later, as you push the limits of your PC's capabilities, you will run into a wall. Memory limits. Drivers that won't load. Crashes. "Out of Memory" messages. And you'll run into this wall whether you have one megabyte in your PC or 16.

That's why millions of people, from PC gurus to novice users run QEMM®. It fixes memory problems and keeps your PC performing at its best.

Introducing QEMM 7.5 It Makes Room for All the Good Stuff

Our newest QEMM takes into account the greater demands you're putting on 'conventional' memory today: device drivers, sound cards, disk compression, caches, network utilities, CD ROM drivers, etc. Not to mention all the stuff you want for tomorrow, like the drivers you'll need for Internet utilities. It finds room for all those things so you don't have to sacrifice capabilities you want—now or in the future.

MemMaker, the memory utility that comes with DOS 6, does an OK job of delivering additional memory, but it just hasn't kept up with demanding users.

Say you wanted to run a mouse, sound card, SmartDrive, your DOS 6 and Novell utilities, and your Microsoft Bookshelf '94 CD ROM. You couldn't with MemMaker. Not unless you were willing to manually 'tune' it. And then you might end up with 490K or so to use. But QEMM 7.5 routinely returns 634K of conventional memory. And when you consider as little as one 'K' of memory makes the difference between a program loading or not, you can see where an additional 140K or so could be vital.

Hot new features

- 100% Windows installable
- Faster 32-bit memory model
- PCMCIA support
- *Stealth Stacker* saves 8-32K
- *QuickBoot* saves time
- *Optimize/Restore* lets you revert to recent settings

A side benefit of running QEMM is that with memory 'elbow room' you get more reliability—fewer crashes and hangs. And some programs (especially games) run faster and smoother.

When you run DOS programs in Windows, QEMM 75 will provide benefits for those programs, too. Many productivity programs won't even run without it unless you sacrifice drivers and other goodies.

Our new Manifest memory analyzer now runs in Windows. And it's still free with QEMM.

QEMM 75 comes with a new version of our award-winning memory utility, Manifest, which reports details you can't find out any other way—like how Windows and the programs running under it are using memory or what software is using your IRQs.

There are dozens of new features and improvements to our new QEMM, making it even faster and safer. Find out for yourself. Visit your favorite software dealer or call (800) 571-4860 for a free brochure.

Stop making sacrifices. Get QEMM 75—the safest, most powerful memory manager for Windows, DOS and games.

Quarterdeck

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Quarterdeck, 150 Pico Boulevard, Santa Monica, CA 90405 (800) 571-4860 Fax (310) 314-4219
Quarterdeck International Ltd., B.I.M. House, Crofton Terrace, Dun Laoghaire Co. Dublin, Ireland Tel. (353) (1) 284-1444 Fax: (353) (1) 284-4380

Registered U.S. users of earlier versions of QEMM may purchase upgrades from dealers or direct from Quarterdeck for $29.95 plus $5 shipping & handling. Call (800) 354-4757.

Circle 187 on reader service card.

No More SCSI Nightmares

When it comes to installing hardware, no interface has caused more sleepless nights than SCSI. But if Plug and Play really works, you'll be able to install a SCSI controller and attach a hard disk, CD-ROM drive, tape backup drive, or scanner—all without flipping a switch. No changing interrupts, I/Os, IDs, or termination, and best of all, no tech support. Realizing this, the two heavyweights of desktop SCSI are shipping Plug-and-Play ISA SCSI kits.

Future Domain's SCSI Plug-and-Play Value Pack in based on 1630 ISA SCSI controller and PowerSCSI software, while Adaptec's ReadySCSI centers around the 1530 ISA SCSI controller and EZ-SCSI utility. Both products support full Plug and Play and SCSI Configured Auto-Magically (SCAM), and they include a full suite of utilities and drivers. Plug and Play takes care of the controllers' configurations, while SCAM allows for automatic assignment of SCSI IDs.

Two Ways to Play Of course, to reap the benefits of Plug and Play, all of your hardware must be Plug-and-Play enabled, right? In the case of Future Domain's SCSI Plug-and-Play Value Pack, the answer is yes. If you've got a system with a Plug-and-Play BIOS, the hassles of manually setting interrupts and I/O addresses are eliminated. If you're like most people and don't have such a system, however, the Plug-and-Play part of Future Domain's kit won't help much.

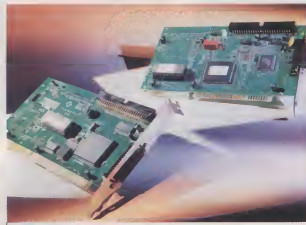
But don't feel abandoned. Adaptec's ReadySCSI kit not only works with the latest Plug-and-Play systems but it also works with legacy hardware that's not Plug-and-Play ready. Included in Adaptec's kit is Intel's ISA configuration utility (ICU), which delivers near Plug-and-Play functionality—even on older systems.

The amazing thing about ReadySCSI is how well it detects non–Plug-and-Play ISA cards. Installed in our test system was an ATI PCI video card, a Tekram IDE caching controller, and a no-name sound card. Adaptec's DOS configuration utility (called Cassist, or Configuration Assistance Utility) found all of our cards and told us exactly which of the switches on the Adaptec AHA-1530P to change. It was virtual Plug and Play even though our system wasn't technically rigged for it (true Plug and Play would have made the necessary changes for us).

Usability Wins At first glance, the SCSI Plug-and-Play Value Pack and ReadySCSI look very similar. Each provides a 10MB-per-second ISA SCSI -II controller, a complete set of utilities, and nearly identical internal SCSI cables with active termination. The differences lie in usability. ReadySCSI's support for Plug and Play is complete, regardless of the system. Equally as impressive is its collection of easy-to-use Windows utilities, from the SCSI interrogator to the SCSI tape backup software and SCSI tutor.

If your plans include outfitting systems with SCSI, then both of the SCSI Plug-and-Play Value Pack and ReadySCSI will save you time, money, and frustration. ReadySCSI simply takes things further by bringing virtual Plug and Play to any system, regardless of whether or not it's Plug-and-Play enabled.

ADAM MEYERSON



Installation Relief: SCSI installation nightmares are history, thanks to Plug-and-Play SCSI adapters from Adaptec and Future Domain. Adaptec's ReadySCSI (right) even brings this advantage to older systems.

PICKS SCSI PLUG AND PLAY

Inexpensive SCSI for Plug-and-Play Systems	SCSI Value Pack
Plug-and-Play SCSI for Any System	Adaptec ReadySCSI

Choose a Connection: Both SCSI adapters support Plug and Play, but the $50 extra for ReadySCSI brings this advantage to any system, regardless of whether or not it conforms to the Plug-and-Play standard.

SCSI Value Pack

USABILITY: *Jumperless installation is a big improvement over early SCSI, but too many software installations are required.* ★★★½

VERDICT: *Great price for a complete kit.* ★★★½

ReadySCSI

USABILITY: *Automatic support and handy utilities make SCSI installation a breeze on any system.* ★★★★½

VERDICT: *All adapters should be this powerful and usable; the easiest way to add SCSI to a system.* ★★★★½

FILEBOX

SCSI Plug-and-Play Value Pack

SCSI Features: SCSI -II
Fast, 10MB-per-second.

$149 est. street price
Future Domain
(714) 253-0400, (800)879-7599
Reader Service No. 671

ReadySCSI

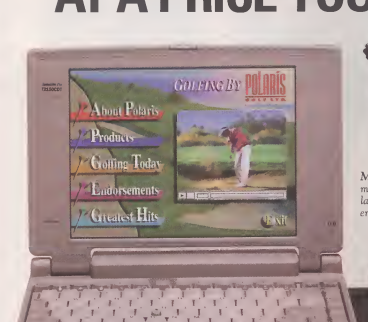
SCSI Features: SCSI-II
Fast, 10MB-per-second.

$195 est. street price
Adaptec
(408) 945–8600, (800) 959–7274
Reader Service No. 672

PHOTOGRAPH BY ARNOLD TOSKEJO

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

CD-ROM TO GO
AT A PRICE YOU CAN TAKE.



Built-in power supply: *Engineered for ultimate portability, there's no bulky external AC adapter to carry, just a slim power cord.*

Multimedia to go: *You can now perform interactive multimedia presentations, retrieve information from large databases and run the hottest educational and entertainment software – wherever you go.*

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- 8MB RAM expandable to 32MB

T2150CDS & T2155CDS*
- 10.4" dia. color DSTN dual-scan display
- 4MB RAM expandable to 28MB

ALL MODELS
- 75MHz Intel DX4™, 3.3v
- 520 Million Bytes (=500MB) HDD
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- 16KB of cache
- Two stacked PCMCIA (PC Card) slots (two Type I-II or one Type III)
- AccuPoint™ integrated pointing device
- VL local-bus video
- Integrated graphics accelerator
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- Audio jacks: headphone/speaker, microphone
- Sound Blaster™ Pro compatible, WAV and MIDI sound support
- Preinstalled software: MS-DOS®, Microsoft Windows™ or Windows for Workgroups™, Video for Windows™ Run Time and Indeo™ video
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- Multimedia help kit
- Toll-free Technical Support – 7 days a week, 24 hours a day

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Circle 215 on reader service card.

New! HARDWARE: Zaurus ZR-5000

Sharp's Portable Pocket Assistant

USABILITY: *Highly portable with lots of integrated applets, but sharing information with Windows PCs takes patience.* ★★★½
TECHNOLOGY: *PC Card slot, infrared and serial port, fax modem.* ★★★★
VERDICT: *More organizer than PDA, Sharp Wizard fans will love it.* ★★★★½

If you lug around a laptop just for basic communications and time management away from your desk and think PDAs are underpowered and overpriced, take a test drive of Sharp's pocket-sized Zaurus ZR-5000. It improves on Sharp's popular Wizard line of electronic organizers, providing more memory for applications, a PC Card expansion slot, larger keyboard keys, a larger display, and dozens of new applets.

Pint Size: Sharp's 14-ounce Zaurus ZR-5000 helps you keep tabs on your contacts without weighing you down.

Using a proprietary operating system that was developed by Sharp, the Zaurus ZR-5000 packs desk accessories, contact databases, time management tools, a scaled-down word processor, and even communications hardware into a trim 14-ounce package.

Sharing data between the Zaurus ZR-5000 and your Windows PC is somewhat awkward. Connection options include a wireless infrared port and a 15-pin serial port, either of which can connect the device to another Zaurus, a Wizard, a PC, or a Macintosh.

Printing and faxing are useful but optional features on this PDA. Faxing requires a $99 Sharp CE-FM4 fax modem (9,600/2,400 bps), and you can only send faxes with it, not receive them. The Zaurus ZR-5000 includes its own drivers for several printers, though an optional $79 wireless printer interface is required.

Sharp's Zaurus ZR-5000 offers keypad and pen input and basic communications features in a pocket-sized package. If you don't need a full-fledged notebook and are looking to lighten your load, this could be your traveling machine. **RICH SCHWERIN**

FILEBOX

Zaurus ZR-5000

Features: 16-bit proprietary Sharp CPU, 4-by-2.6-inch display, 1MB of RAM, 13.6 ounces, powered by two AA batteries, one Type II PC Card slot, 15-pin serial port, infrared port, 9,600-bps fax modem (send only), 2400-bps data modem (optional).

$649 est. street price ($749 with fax modem)
Sharp Electronics
(800) 237-4277, (201) 529-8900
Reader Service No. 673

BitSurfr TA210

Hanging Ten on the ISDN Wave

USABILITY: *A cinch to plug in, but hard to configure.* ★★★
TECHNOLOGY: *Marries NT1, ISDN modem, and terminal adapter in one box.* ★★★★
VERDICT: *A supercheap digital connection to the I-Way.* ★★★★½

Before you fall for the alluring high-speed promise of ISDN, ask yourself two questions: Does your local telephone company offer it? And if so, is it offered at a reasonable price? If you can answer yes to both questions, and you're setting up or upgrading your home office to ISDN, you'll want to consider Motorola's new $399 ISDN terminal adapter, the BitSurfr TA210.

The BitSurfr TA210's NT1 lets you plug directly into ISDN. It also includes a standard RJ-11 jack, so you can plug an analog phone or fax machine into the unit and take advantage of its simultaneous voice and data communication. While the BitSurfr TA210's installation routine is a simple serial connection, configuring the ISDN line type, switch, SPIDs, and channels requires an interview with your telephone company.

Purple on the Net: Run a high-speed ISDN line to your desk with Motorola's purple BitSurfr TA210.

The BitSurfr TA210's Configuration Manager software is Windows based and prompts you to enter your line specifications, COM port information, and so on.

One minor drawback: The BitSurfr TA210 doesn't include an analog modem like its big brother, the $800 HMTA 200 adapter. But if you already have a modem, the BitSurfr TA210 is a great way to add a digital hookup to your analog setup; just plug your modem into the BitSurfr TA210 and save yourself $400. **RICH SCHWERIN**

FILEBOX

BitSurfr TA210

Competition: None—this is the cheapest way to get a terminal adapter, NT1, and ISDN.

Requirements: 486 CPU, Windows 3.1, ISDN line.

$399 est. street price
Motorola
(800) 766-4883, (205) 430-8000
Reader Service No. 674

PHOTOGRAPHS BY ARNOLD TOSKEI

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Your workgroups get the HP LaserJet 4V network printer. And you get $250 off. What a steal!

Under $2,200*

The HP LaserJet 4V with HP JetDirect card, after rebate. The HP LaserJet 4MV is under $2,800 after rebate.

For a limited time, HP will take $250 off the price of either the HP LaserJet 4V with a qualifying HP JetDirect card or the LaserJet 4MV. But savings aside, you just won't find a better solution for the needs of a busy workgroup. First of all, these mid-volume network printers are fast. They clock in at 16 ppm, fueled by a 33.3-MHz RISC-based processor. Each one accepts a wide variety of paper sizes. And, because they feature HP JetAdmin printer management software, printing will be noticeably smoother for everyone involved. For more information about the printers and the rebate, see your nearest authorized HP dealer.

HP Network Printers
Just what you had in mind.

HEWLETT® PACKARD

*Average U.S. retail price. Actual price may vary. Price is based on HP LaserJet 4V when purchased with an Ethernet (10Base-T) JetDirect card (J2550A) JetDirect card prices vary. Offer good through 12/31/95. For further assistance, call 1-800-752-0215. ©1995 Hewlett-Packard Company PE12553

WELCOME TO CRESTED

SKI SCHOOL. YOUR FIRST EXERCISE FOR TODAY IS TO STRETCH

Next: a black diamond run. And why not? After a Microsoft® PowerPoint® 4.0 presentation, anything seems possible.

That's just the way Marni Joslyn, head instructor of the Never Ever Ski School, wants it. After all, her job is to convince every stumbling, wobbly-kneed, double left-footed beginner that he can make it down the mountain. (And you think you've got it tough.)

Not surprisingly, before Marni brings her students to the mountain, she brings the mountain to her students. With PowerPoint 4.0, the leading presentation graphics software.

Since Marni's familiar with the Microsoft Office family of applications, she's already familiar with PowerPoint's menus and toolbars. This makes getting started and navigating her way around as easy as getting down the bunny slope.

How can she put such persuasive presentations together?

Simple. First, she clicks into AutoContent Wizard, which helps her organize and outline her overall presentation thoughts and even offers tips on content.

Next step, she clicks into AutoLayout Gallery and chooses a slide layout from the more than 20 options available.

As if that wasn't easy enough, there's the handy Pick A Look Wizard to help her create the right look for her presentation. In short, PowerPoint 4.0 helps Marni perform like a true professional.

As Marni is often heard telling her students, practice makes perfect. Fortunately, the Rehearsal feature allows her to do just that—practice, practice, practice, so she never has to worry about falling flat in front of her class.

What really makes Marni content at the end of the day is the power to take her students up that imaginary mountain and see them safely down again. (The only bruises the students

©1995 Microsoft Corporation. Microsoft Office Professional, shown here, includes Microsoft Excel, Word, the PowerPoint presentation graphics program, Microsoft Access, and a Mic
Outside the U.S. and Canada, call your local Microsoft subsidiary or (206) 936-8661. Customers who are deaf or hard-of-hearing can reach Microsoft text telephone (TT/TDD) services

BUTTE

have to show for their exhilarating descent are imaginary.)

For such a feat, she certainly deserves an award. Microsoft PowerPoint 4.0 has already won its fair share, eight of the industry's most prestigious.

Everyone has his own mountain to face, PowerPoint 4.0 can help you to face yours. Don't be afraid. Call (800) 240-4782, Department XQP for more information.

In the meantime, welcome to the great indoors. Gulp.

Microsoft

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workstation licence. (Server and software must be acquired separately.) For information only in the 50 United States, call (800) 240-4782, Dept. XQP. In Canada, call (800) 563-9048 by dialing (800) 892-5234 in the U.S. or (905) 568-9641 in Canada. Microsoft and PowerPoint are registered trademarks and Where do you want to go today? is a trademark of Microsoft Corporation.

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Circle 156 on reader service card.

New! SOFTWARE: Animator Studio · Close-Up 6.0 vs. Norton pcAnywhere 2.0 · Infinite Disk, NeverEnding Disk, Disk Historian 2.0

USABILITY: *A snap to use—no manuals necessary.* ★★★★½

TECHNOLOGY: *Smartly configurable to your business and financial news preference, though we'd like to see keyword searches.* ★★★★

VERDICT: *All the news you need (and only the news you want) delivered to your keyboard.* ★★★★½

Personal Journal

All the News You Want to Print

You trust editors to act as news threshers, separating the wheat from the chaff. But as it turns out, you're interested in only a few stories on page one, stock prices for a handful of companies, weather in two cities, and last night's box score from Camden Yards. Want to personalize your daily dose of news? Try Dow Jones's new Personal Journal.

Personal Journal is a customizable electronic copy of the *Wall Street Journal.* It contains only the information you request, such as news briefs, features, stock prices, major market indices, sports, and weather. And at only $12.95 per month, you won't find a more personalized news source.

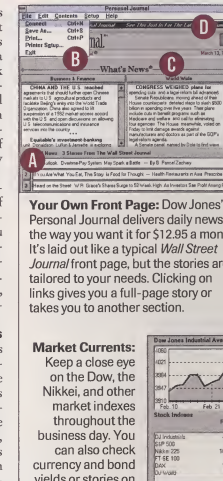
Custom Communiqués Customizable electronic news isn't a new idea. PED Software's Journalist (see "The Morning Fix—Online News via Journalist and CompuServe," February 1994, page 51), Reuter's Money Network, CompuServe Executive News Service, and others have been doing it for awhile. But content counts, and only Personal Journal gives you all of the *Wall Street Journal.* It's *also* faster and more straightforward than some alternatives.

To begin with, you specify Personal Journal's front page layout by selecting a combination of ten of your favorite *Wall Street Journal* columns and stories about companies of special interest to you. This front page is anchored by the *Wall Street Journal*'s familiar "What's News" column of short items, and you can choose headlines of other columns as well: "Heard on the Street," "Your Money Matters," and "Personal Technology."

Market Watch One bonus of this service is that some of the company stories you choose might not make the newsstand copy. Also, you don't have to wait 24 hours for a new issue. Dial in as often as you like for updates on your stocks and mutual funds on the Portfolio page and for late-breaking news on the This Just In page (each call adds 50 cents to your bill).

In addition, you can check the Markets page for at-a-glance updates of several major financial indexes, such as the Dow Jones Industrial Average, Standard and Poor's 500, U.S. Treasury Bill yields, and worldwide currency exchange rates. These items are often bolstered by market-specific news stories.

It would be nice if Personal Journal supported keyword topic searches the way the Executive News Service does, so you could quickly gather stories on specific topics. This is where Dow Jones's News/Retrieval (a separate product) comes in handy. Dow Jones doesn't intend Personal Journal to replace News/Retrieval or your printed copy of the *Wall Street Journal.* It's simply supposed to be a fast update. But Personal Journal is so complete that it could become your main news source. MIKE HOGAN



A. Click a **headline** to get full copy on your choice of ten popular columns and stories on companies of interest to you.

B. If you can't get to all the news today, **print out or save** to disk an entire issue or specific stories.

C. The *Wall Street Journal*'s familiar **What's News** column of news briefs anchors your front page.

D. A familiar **folder metaphor** and **page turner** icon make navigating a breeze.

Your Own Front Page: Dow Jones's Personal Journal delivers daily news the way you want it for $12.95 a month. It's laid out like a typical *Wall Street Journal* front page, but the stories are tailored to your needs. Clicking on links gives you a full-page story or takes you to another section.

Market Currents: Keep a close eye on the Dow, the Nikkei, and other market indexes throughout the business day. You can also check currency and bond yields or stories on market changes.

FILEBOX

Personal Journal

Competition: Reuter's Money Network (delivers market and stock data only), CompuServe's Executive News Service, Dow Jones's News/Retrieval (searches a dozen wire services by keyword and ticker symbol), and PED Software's Journalist for CompuServe or Prodigy (lets you configure personal news, financial markets, business news, weather, and sports).

Minimum System Requirements: 386 with 4MB of RAM (8MB recommended), 10MB of hard-disk space, 9,600-bps or faster modem.

Free software, $12.95 per month (50 cents for each additional edition)
Dow Jones
(800) 291-9382
Reader Service No. 675

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

An Affordable 3-D Studio for Your PC

USABILITY: *Easy to learn, but not easy enough to encourage amateurish experimentation.* ★★★
TECHNOLOGY: *All the right pieces—24-bit color, 2-D animation, Video for Windows support, and great sound editing.* ★★★★
VERDICT: *Doing multimedia production on a PC? Be sure to check out Animator Studio.* ★★★★

SNEAK PREVIEW

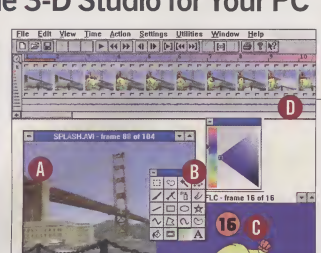
Ever wanted to create 3-D animations similar to the ones you've played with in CD-ROM games like 7th Guest or Critical Path? Well, you can't do that without investing a few grand in 3D Studio and yet more in video, animation, and sound editing software—that is, unless you get Autodesk's Animator Studio. With this Windows release, Autodesk wraps up features from its pricey 3D Studio and Animator programs with a bundle of other capabilities for making slick multimedia projects a reality.

An Animated Exchange

What do multimedia cartoonists need most, apart from the ability to use pen-style input devices? Do they need 24-bit color? The power to draw or airbrush right on top of digital images? Onion-skinning? Cut-and-paste between multiple animations? All of these features are built in to the true-color animation module of Animator Studio.

The minute controls over animation are very handy and easy to pick up. Within an hour, we had grasped the intricacies of animated objects' motion envelopes and were controlling them with precision. Equally easy was superimposing an animation over a Video for Windows file. And when it comes to importing graphics, the program rounds up all the suspects, from static JPEG, TIFF, TGA, and normal Windows-supported formats to the motion-video AVI, FLI, and FLC formats.

If you have any doubts about the playback capabilities of your audience's system, ignore them. Autodesk includes a free player with Animator Studio. There's also a fairly large collection of royalty-free media clips that you can use as a starting point for your own work.



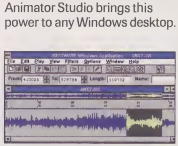
Beyond Flipbooks: Want to create slick animations and multimedia effects? Autodesk's Animator Studio brings this power to any Windows desktop.

A. For **Video for Windows support**, there are customized DLLs and a free playback utility.

B. Paint options include 24-bit color, airbrush and other tools, and **Photoshop plug-in** support.

C. The **core animation module** includes a path-based onion-skinning capability and scads of tools.

D. Superimposing a **sprite** over video is child's play in Animator Studio.



Sounds Like a Good Idea: Animator Studio's audio recording application lets you adjust a sound's pitch without affecting delivery speed.

Sound and Vision Once you have your colorful pictures moving, you need to give them the proper soundtrack and synch the two up just right. That's where the Autowave sound editing module comes in. Taking your microphone or line input, you can add sound to animations either live or offline. Since sounds never track exactly with the action, Autowave lets you stretch or squeeze audio to fit the video or animation by adjusting the "dead space" between sounds without affecting the original recordings. And for imitating Alvin and the Chipmunks or the gravel-voiced Johnny Cash, there are tools for adjusting the pitch without changing playback speed. There are other audio effects as well.

Strangely enough, Animator Studio is a 16-bit application. While this doesn't make it inherently slower than a 32-bit application (and the prerelease software that we evaluated certainly didn't show any signs of undue slowness), it's odd that with the proliferation of 32-bit options—from OS/2 Warp to Win32S and Windows 95—Autodesk would choose the 16-bit route for a series of applications that are this graphics and processor intensive.

Not surprisingly, the animation elements are only two-dimensional, but they handle 24-bit color, which gives them depth and texture. That alone makes Animator Studio a worthy alternative to Autodesk's pricey 3D Studio. Throw in the sound capabilities and other elements, and this is a multimedia must-buy. **MATTHEW LAKE**

FILEBOX

Animator Studio

Competition: Caligari's trueSpace handles 3-D animation at this level, and Adobe Premiere covers video and audio editing, but neither attempts to tackle both media the way Animator Studio does.

System Requirements: 486 or faster, 8MB of RAM (16MB recommended), 16- or 24-bit color video, sound card, CD-ROM drive, microphone and video capture for audio and video recording, at least 15MB of hard-disk space.

$795 est. street price
Autodesk
(800) 879-4233
Reader Service No. 676

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

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AST COMPUTER

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Circle 197 on reader service card.

The Omnipresent Desktop

Stashed safely on your PC's hard drive is everything you need—your schedule, the big presentation you've been slaving over, and that all-important report due tomorrow morning. Problem is, you're not going to be at your desk between now and then. Instead of messing around with modems and remote control software, you decide it's easier to copy all of your files onto a notebook and take them with you.

If remote control software really worked, you'd be able to have your PC on standby and just dial in for files as you need them. But as everyone knows, remote control software is unreliable, slow, and a real headache to use. Or is it?

Dial-up Desktop Both Norton-Lambert's Close-Up 6.0 and Symantec's Norton pcAnywhere 2.0 for Windows want you to give remote control a second chance. The products claim they will solve your location woes with automatic installation, instant access to your PC, and easy downloads. All you need is a notebook, a modem, and a copy of Close-Up or pcAnywhere. But while both products let you control your desktop remotely, only Close-Up addresses the performance issues that have made remote control clumsy.

Close-Up installs and loads in DOS but gives you full access to DOS *and* Windows. No modifying INI files, and no loading DLLs. Why DOS? In a word: performance.

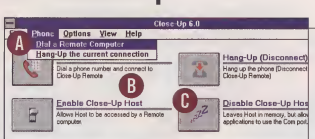
Our test bed included desktop and notebook PCs running 14.4Kbps modems with the desktop video resolution set to 800 by 600 pixels. Using pcAnywhere under Windows was somewhat like browsing an online service with a 1,200-bps modem: Screen redraws were excruciatingly slow, and the delayed mouse reaction was hypnotizing.

Close-Up, on the other hand, was snappy and responsive. It even synchronized the Windows video resolution on our systems automatically (pcAnywhere required two manual adjustments of the video before we could make a connection). Also, downloading a 788K file took less than five minutes with Close-Up and almost six minutes with pcAnywhere.

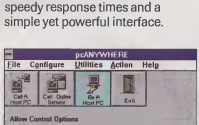
Usability Touches Historically, remote control's performance problems have made usability a secondary concern. With performance up to snuff, however, Close-Up has made great strides in ease of navigation. Press two keys and up pops a simple menu from which you can send or retrieve files, change settings, or initiate a chat session. Press the Escape key and the menu disappears, leaving you with a view of your remote PC.

pcAnywhere gives you a choice of controlling the PC you're currently using or controlling the remote system you're calling. It's an interesting idea, but after 20 minutes of searching for the menu to start a download, we longed for Close-Up's more direct approach. However, once you do find pcAnywhere's remote online menu, it's relatively easy to send and receive files, and the built-in file manager has a simple yet powerful interface.

Both Close-Up and pcAnywhere provide all the basic functions of remote control software as well as a number of extras that make them ideal for long-distance support. Still, Close-Up's performance edge and simplicity make it a clear choice over pcAnywhere's less refined interface and sluggish speed. ADAM MEYERSON



Dial-up Desktop: With remote control software, files and applications on your desktop PC are just a modem call away. Norton-Lambert's Close-Up 6.0 is the first product to make remote control software truly usable. It offers speedy response times and a simple yet powerful interface.



Slick, Powerful, and Slow: The host interface of Symantec's Norton pcAnywhere is well thought out for easy downloads, uploads, and chat.

A. Close-Up makes it easy for you to **connect** to your desktop PC remotely. Straightforward pull-down menus guide you through dialing a remote computer.

B. The program loads from DOS for better performance, but it's also easy to control inside of Windows. With **one button click**, you can enable your desktop to be accessed by a remote computer.

C. Close-Up lets you **leave the host** in memory, but still lets other applications use the com port. It also includes a transaction log and session recording.

Close-Up 6.0

USABILITY: *Automatic installation; intuitive, easy-to-use menus; synchronized video resolutions.* ★★★★

VERDICT: *The usability and speed leader.* ★★★★

pcAnywhere 2.0

USABILITY: *Lots of options, but good luck finding what you need.* ★★★

VERDICT: *Interface and speed improvements would help.* ★★★

FILEBOX

Close-Up 6.0

Key Features: Remote control via modem, file transfer.

$199 est. street price for both host and remote
Norton-Lambert
(805) 964-6767
Reader Service No. 677

Norton pcAnywhere 2.0 for Windows

Key Features: Remote control via modem or LAN, file transfer.

$129 est. street price for both host and remote
Symantec
(800) 441-7234, (408) 253-9600
Reader Service No. 678

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

RIGHT NOW, THERE ARE HUNDREDS OF VALUE DESKTOPS. BY THE END OF THIS AD, THERE WILL BE ONLY ONE.

LET'S START BY SAYING THAT this is unashamedly an ad for the AST® Bravo MS. And the assumption we're making is that you're currently weighing the implications of moving over to one of the new 32-bit operating systems, like Windows™95.

On the surface of it, there are hundreds of desktops to choose from.

Obviously, they have to be Plug and Play ready to even be in the running. And, of course, they have to be affordable.

Ideally, they'll have at least a 75MHz Pentium™ Processor. And the processor, cache, graphics, system RAM and hard drive will be easily upgradable.

Up to two PCI, five ISA expansion slots, and 7 drive bays are important for enhancement flexibility.

And how about a PCI-based graphics subsystem plus a myriad of advanced power management and security features?

Clearly the Bravo MS has all of this, or we wouldn't be mentioning them.

But there's something else we haven't mentioned: AST NetFlash BIOS. It enables you to update all your Bravo MS desktops from a central location.

AST has it, the others don't. With theirs, you'll have to reconfigure each of the computers on the network individually. And the more you have, the bigger pain it will be.

What more can we say? Except that the Bravo comes in low-profile, mid-size and mini-tower versions. And ASToffers 24-hour/7-day telephone support, a 3-year limited warranty* (first year on-site) and comprehensive reseller support in the field.

Talking of resellers, you might want to call us at (800)876-4AST for the name of the one nearest you.

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Circle 119 on reader service card.

New! SOFTWARE: Infinite Disk, NeverEnding Disk, Disk Historian 2.0

Hard-Disk Spring Cleaning

It's Parkinson's Law of Storage: Files expand to fill all available disk space. And then they keep expanding.

If free disk space is on your personal endangered-species list, you'll be tempted by three new utilities that promise to automate the disk-pruning process. Chili Pepper Software's Infinite Disk brings hierarchical storage management (HSM) to the desktop—Sytron's NeverEnding Disk is the same software in a different package—while Solid Oak Software's Disk Historian 2.0 uses a combination of compression and the Delete key to eliminate files. Either approach can help you put off buying a new hard disk for a while, but be prepared for side effects.

Squeeze Play Infinite Disk and NeverEnding Disk use DOS and Windows device drivers and memory-resident utilities to track how often you access files. Then you define rules for storing files based on how often you need them. Regularly accessed files—Level 0—are stored normally. Less critical Level 1 files are compressed wherever they're currently stored, while rarely used Level 2 files migrate to another location: a file server or a stack of floppy disks. Your applications think the files are in their original location; the utility retrieves and decompresses them in the background when you need them.

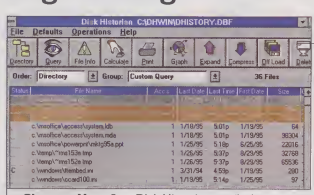
On a stand-alone system, Infinite Disk and NeverEnding Disk installed easily and worked well. The LZW compression shrank files to varying degrees, with graphics files benefiting most. However, we ran into some incompatibilities with Windows for Workgroups 3.11. We had to disable 32-bit file access, and neither package supports file sharing: When we tried to access compressed Excel files on a shared volume, we saw gibberish.

If you use PKzip or Stacker, you won't see a benefit; in fact, you may lose space as Infinite Disk or NeverEnding Disk tries to recompress files. In addition, the software is incompatible with PC Tools' Diskfix.

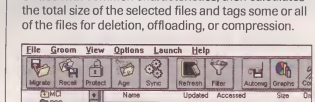
History Lessons Disk Historian also uses a DOS device driver and a set of Windows utilities to track file use. First you use a Query tool to identify files that are gathering dust (the DBF-formatted database tracks the frequency and date of file accesses). Then you tag unused files and press a button to compress or delete them—or to off-load everything to another storage medium.

Disk Historian provides valuable information, but it's typically overkill. You have to remember to turn off disk logging before running antivirus software, and the warning messages that appear when you delete certain files are intimidating. Also, there's no easy way to restore files off-loaded to a diskette or file server.

If your hard disk is bursting at the seams, disk compression Stacker-style should be your first choice. There are too many glitches and not enough gains to recommend Infinite Disk or NeverEnding Disk. If you're willing to put up with a flawed interface, Disk Historian is a better solution. But it proves another immutable law of business (and computer file storage): There ain't no such thing as a free lunch. ED BOTT



Clean up Your Act: Disk Historian 2.0 finds a group of files with common characteristics, then calculates the total size of the selected files and tags some or all of the files for deletion, offloading, or compression.



Where You Stand: NeverEnding Disk's front end shows which files are compressed, which are stored elsewhere, and which are protected from alteration.

Infinite Disk, NeverEnding Disk

USABILITY: *Easy to install, but nonstandard utilities.* **
PERFORMANCE: *Reclaimed acres of hard-disk space, but be prepared for some side effects.* **
TECHNOLOGY: *Doesn't work with Windows for Workgroups.* *
VERDICT: *Too many glitches to recommend.* *

Disk Historian 2.0

USABILITY: *Baffling, jargon-filled interface.* **
PERFORMANCE: *File-access index and database are blazingly fast.* ***
TECHNOLOGY: *Why doesn't DOS do this?* ***
VERDICT: *Supplies valuable file information, but for experts only.* **

FILEBOX

Infinite Disk

Minimum System Requirements: Windows 3.1, 4MB of RAM, 2.2MB of hard-disk space.

$129 est. street price
Chili Pepper Software
(800) 395-1812, (404) 339-1812
Reader Service No. 679

NeverEnding Disk

Minimum System Requirements: Windows 3.1, 4MB of RAM, 3MB of hard-disk space.

$129 est. street price
Sytron
(508) 898-0100
Reader Service No. 680

Disk Historian 2.0

Minimum System Requirements: Windows 3.1, 4MB of RAM, 3MB of hard-disk space.

$49 est. street price (single user), $449 (network license)
Solid Oak Software
(805) 967-9853
Reader Service No. 681

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

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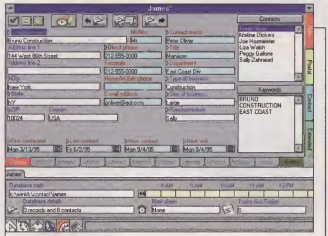
New Acts in Contact Management

There's a reason why Rolodex, Daily Minder, and Post-it are household words: They're successful low-tech solutions to the need for contact management. Whether you're consolidating the sales team or keeping track of your own contacts, you need to organize all those names and numbers. Symantec's Act does the job, but there are other software solutions. TeleMagic 1.5 for Windows offers its own spin on the art of contact management, as does Tracker 2.0 for Windows.

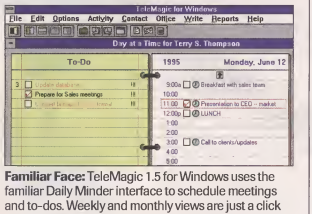
Bits of Magic In TeleMagic, you start at the main Company screen, which displays general company-level data. Click on the Contact icon, and you see a separate view displaying details such as phone numbers, addresses, an interaction history, and more notes. Modules such as report writing or scheduling are loaded by clicking on buttons in the toolbar, which requires only minor familiarization. A search-and-sort engine sits conveniently below data in all contact screens.

TeleMagic's familiar Day-Timer metaphor makes its daily scheduling module a breeze. In addition to weekly and monthly views, there's an activities list with due dates. You can easily link activities with contacts and set alarm reminders (with lead time). Smart attention to detail comes off as common sense: Schedule an appointment on a weekend, and the software asks you to reconsider.

TeleMagic also lets you set enterprise-wide controls with viewing and editing filters, and you can integrate users via a proprietary or a third-party e-mail system. Most impressive is its database synchronization feature, which ensures that the latest versions of contact and activity data are updated automatically, thereby accounting for your road warriors.



Nicely Integrated: Tracker 2.0 for Windows places tabs all around contact records so you can quickly access notes and data. A mini-scheduler sits on the bottom of the screen, while icons for major modules reside in an easy-to-reach spot (lower left corner).



Familiar Face: TeleMagic 1.5 for Windows uses the familiar Daily Minder interface to schedule meetings and to-dos. Weekly and monthly views are just a click away; double-click to bring up appointment boxes.

The Right Track Tracker has so carefully considered workgroup situations that it may be overkill for individual users. Every record contains numerous views and fields geared toward different departments. Contact screens have horizontal and vertical tabs along their perimeter, which lets you quickly select among four specific views (or sides).

For novices, Tracker offers 11 predesigned templates (for law, medicine, accounting, and so on) to start the process.

In addition to the common daily, weekly, and monthly views, there is a yearly planner, a task list, a free-time indicator, and a daily view of everyone's schedule. Resources such as conference rooms are treated like individuals, and when you set up appointments, there's ample room for notes, alarms, and predesigned icons to specify what type of meeting you've scheduled. Tracker also links appointments to contacts.

While neither product offers a unique approach to contact management, they both surpass Act with workgroup features like multiple contacts per company. But only Tracker opens more than one database at a time and lets you drag and drop records between them. The addition of Wizard-like instructions and templates make it our top pick. JAMES OLIVER CURY

TeleMagic 1.5

USABILITY: *Attractive interface and familiar scheduling, but few usability perks.* ★★★

VERDICT: *Ideal for sales and remote staffs—after the learning curve.* ★★★

Tracker 2.0

USABILITY: *Consistent tab interface across all modules and views.* ★★★★

VERDICT: *More features, greater ease of use.* ★★★★

FILEBOX

TeleMagic 1.5 for Windows

Competition: Symantec's Act is the market leader, but it's a huge market.

System Requirements: Windows 3.1, 8MB of RAM, 10MB of hard-disk space.

$500 est. street price
TeleMagic
(800) 835-6242
Reader Service No. 682

Tracker 2.0 for Windows

Competition: Tracker challenges Act.

System Requirements: Windows 3.1, 2MB of RAM, 5MB of hard-disk space.

$349 est. street price
Tracker Software
(800) 755-2812
Reader Service No. 683

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

COOL CONCEPT

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GATEWAY2000

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The latest memory technology and the performance of next-generation cache is here with the introduction of Extended-Data-Out (EDO) memory and pipelined burst cache, now available with the introduction of Intel®'s new Triton chip set. EDO memory, standard on our P5-75 Family PC™ multimedia system, P5-75, P5-100 Best Buy, P5-120 Best Buy and P5-120XL systems, is designed to deliver high-speed memory so you can easily whiz through memory-intensive graphics, number-crunching applications and future multitasking environments like Windows™ 95.

The EDO memory and pipelined burst cache on the P5-120XL create a bang-up combination of performance — together they produce breakneck speeds boosting system performance up to 20 percent. It's the ultimate memory combination for today's high-end Pentium™ processors.

Humongous, gargantuan, whopping — that's the only way to describe the 1.62GB hard drive — another star in Gateway's stellar performance lineup. It's the largest IDE hard drive you'll find anywhere, and it features Mode 4 support — you'll tear through tons of data in no time flat! The 1.62GB hard drive also features a super-impressive 9ms access time and 12.5Mb/s data transfer rate.

We've also led the industry with the addition of the ultra-fast 4X CD-ROM standard on our entire product line. With a throughput of 600KB per second, you can experience true full-screen, full-motion video. Plus, it's ATAPI compliant and ready for Windows 95.

The New P5-120XL!

Things are really heating up in the PC world with the introduction of Gateway 2000's P5-120XL. This system was touted as the "FASTEST PC IN THE WORLD" by *PC/Computing*. The P5-120XL is an undisputable breakthrough, featuring a truly amazing combination of performance and speed with 16MB EDO memory, 256KB pipelined burst cache, a 1.62GB IDE hard drive and the industry's first 4X three-CD changer.

GATEWAY 2000

Features To Indulge In

- The PC industry's one-and-only 4X three-CD changer
- Incomparable Generations Software Collection with 51 titles
- 4X CD-ROM drives standard on ALL Gateway PCs
- Vivitron™ monitors based on Sony® Trinitron® technology
- MS® Office Professional — the #1 selling software suite in the universe
- The world's fastest version of Windows™ — MS Windows for Workgroups
- Our signature cow-spotted boxes — very trendy

Unconditionally The Highest Quality

- Only the very best name-brand components
- Our exclusive programmable AnyKey® keyboard
- Ergonomically designed MS mouse
- Every component we use to build your Gateway PC is quality audited
- Award-winning toll-free service and support for the life of your system
- Each and every Gateway 2000 employee wants you to have the best PC on the planet!

intel inside

GATEWAY2000

800-846-2062

The Coolest Extras

You get tons of other features with your Gateway PC including the TelePath IIv fax/modem Communication Center — it's a fax machine, modem and answering machine all in one!

Plus you get Corel Photo CD Sampler Special Edition Software; complete system documentation; a thirty-day money-back guarantee; a three-year limited warranty on all desktop PCs and monitors; on-site service in most U.S., Canadian and some international locations; and an easy door-to-door delivery plan for U.S. and Canadian customers. Write or call us a for a free copy of our warranty.

Our knowledgeable service reps are at your beck and call for the life of your PC with toll-free support available in the U.S., Canada and Puerto Rico. We strive to give you the very best service and support. Thanks to votes of confidence from customers, we receive many awards. In fact, we topped the last five *PC Magazine* Reader's Choice Service and Reliability Awards.

The Best Quality

Each and every component in your Gateway PC is meticulously selected. Every processor, motherboard and peripheral is the best we can possibly offer. From our MS mouse to our AnyKey® keyboard to our famous cow-spotted boxes, we work to ensure that every item you receive with your PC is unsurpassed in quality.

The Best Value

Gateway 2000's prices are some of the most affordable in the industry. And we're offering all the performance, features and quality a PC user could hope for. This is what "value" is all about. Just flip the page and take a look at our configurations. We think you'll agree that giving you only the best really is a cool concept. Call us today and get *your* share of Gateway's best!

GATEWAY2000

"You've got a friend in the business."®

800-846-2062

Excellent Features

The Exclusive 4X Three-CD Changer

Gateway 2000 indulges your every computing desire with the world's best features! Introducing the 4X three-CD changer — we're the first in the industry to offer this multimedia user's dream. It's standard on our P5-100 Family PC multimedia system and P5-120XL and available as an upgrade on all other Gateway PCs. The 4X three-CD changer lets you breeze through today's CD-ROM-based software. You can load three CDs into the changer, which combined hold 1.8GB of data, and easily choose the correct disc through on-screen commands. It features a headphone jack, volume control, skip function, play indicators and play/pause control.

IS THE BEST!

Gateway's Incredible New Generations Software Collection

It's stupendous! Introducing the new Generations Software Collection from Gateway 2000 standard with our Family PCs. With 51 exciting titles on nine CDs, there's no limit to the remarkable resources at your fingertips. Applications include Microsoft® Encarta™ '95; MS Bob; MS Money 3.0; MS Works 3.0; MS Publisher; MS Publisher Design Pack; MS Cinemania® '95; MS Bookshelf®; MS Composer Collection: Beethoven, Mozart and Schubert; MS Wine; MS Arcade: Missile Command,™ Asteroids,® Tempest,™ Centipede® and Battlezone™; MS Dinosaurs; Mayo Clinic® Family Health; and Mayo Clinic Pharmacist; plus we've included dozens of popular Microsoft entertainment games.

MS Office Professional

Our professional PCs come with MS Office Professional 4.3 — the world's number-one selling software suite. It includes Microsoft's most in-demand applications: Word 6.0, Excel 5.0, PowerPoint® 4.0 presentation graphics program and Access® 2.0 database, plus Bookshelf and Money 3.0. It's the only office software program you'll need.

MS Windows For Workgroups

All Gateway PCs come standard with MS Windows for Workgroups 3.11 — the fastest version of Windows available.

Vivitron Monitors Are A Cut Above The Rest

Brace yourself for the vivid color and fantastic screen images available with Gateway's Vivitron™ monitors featuring Sony® Trinitron® tube technology — the technology the most discerning video users have relied on for decades. Our 15- and 17-inch Vivitron monitors, give you brighter, richer and crisper colors, a sharper focus and clearer image. With a .26 fine pitch, you'll also get high screen definition.

Gateway 2000® Family PC™ Systems

4DX2-66 FAMILY PC

- Intel® 66MHz 486DX2 CPU*
- 8MB RAM
- 540MB 11ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 1MB
- 4X CD-ROM, 16-Bit Sound Card & Altec™ ACS-5 Speakers
- TelePath™ IIv 14.4K Fax/Modem Communication Center
- 3.5" Diskette Drive
- 14" CrystalScan® Color Monitor
- 4-Bay Mini Desktop Case
- 101-Key Keyboard & MS Mouse 2.0
- MS-DOS® 6.22 & WFW 3.11
- Generations Software Collection†
- 3-Year Limited Parts Warranty

$1699

P5-60 FAMILY PC

- Intel 60MHz Pentium™ Processor*
- 8MB RAM, 256KB Cache
- 540MB 11ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 32-Bit PCI Graphics Accelerator w/ 1MB DRAM
- 4X CD-ROM, 16-Bit Sound Card & Altec ACS-5 Speakers
- TelePath IIv 14.4K Fax/Modem Communication Center
- 3.5" Diskette Drive
- 15" CrystalScan Color Monitor
- 7-Bay Desktop Case
- 101-Key Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- Generations Software Collection†
- 3-Year Limited Parts Warranty

$1999

P5-75 FAMILY PC

- Intel 75MHz Pentium Processor*
- 8MB EDO Performance-Enhanced Memory
- 730MB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 64-Bit PCI Graphics Accelerator w/ 2MB DRAM
- 4X CD-ROM, 16-Bit Sound Card & Altec ACS-5 Speakers
- TelePath IIv 14.4K Fax/Modem Communication Center
- 3.5" Diskette Drive
- 17" Vivitron™ Color Monitor
- 7-Bay Desktop Case
- AnyKey® Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- Generations Software Collection†
- 3-Year Limited Parts Warranty

$2499

P5-100 FAMILY PC

- Intel 100MHz Pentium Processor*
- 8MB RAM
- 256KB Pipelined Burst Cache
- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 64-Bit PCI Graphics Accelerator w/ 2MB DRAM
- 4X 3-CD Changer, 16-Bit Sound Card & Altec ACS-5 Speakers
- TelePath IIv 14.4K Fax/Modem Communication Center
- 3.5" Diskette Drive
- 17" Vivitron Color Monitor
- 7-Bay Desktop Case
- AnyKey Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- Generations Software Collection†
- 3-Year Limited Parts Warranty

$2999

Professional Systems

4DX2-66

- Intel 66MHz 486DX2 CPU*
- 8MB RAM
- 540MB 11ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 1MB
- 4X CD-ROM
- 3.5" Diskette Drive
- 14" CrystalScan Color Monitor
- 4-Bay Mini Desktop Case
- 101-Key Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Works 3.0 & Money 3.0
- 3-Year Limited Parts Warranty

$1499

P5-75

- Intel 75MHz Pentium Processor*
- 8MB EDO Performance-Enhanced Memory
- 730MB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 32-Bit PCI Graphics Accelerator w/ 1MB DRAM
- 4X CD-ROM
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
- 7-Bay Desktop Case
- AnyKey Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional 4.3** Bookshelf® & Money 3.0
- 3-Year Limited Parts Warranty

P5-75 $1999
P5-90 $2199

(90MHz Pentium processor w/8MB FPM DRAM, 256KB cache)

P5-100 BEST BUY

- Intel 100MHz Pentium Processor*
- 8MB EDO Performance-Enhanced Memory
- 256KB Pipelined Burst Cache
- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 64-Bit PCI Graphics Accelerator w/ 2MB DRAM
- 4X CD-ROM
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
- 7-Bay Desktop Case
- AnyKey Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional 4.3** Bookshelf and Money 3.0
- 3-Year Limited Parts Warranty

$2499

P5-120 BEST BUY

- Intel 120MHz Pentium Processor*
- 16MB EDO Performance-Enhanced Memory
- 256KB Pipelined Burst Cache
- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- 64-Bit PCI Graphics Accelerator w/ 2MB DRAM
- 4X CD-ROM
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
- 7-Bay Desktop Case
- AnyKey Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional 4.3** Bookshelf and Money 3.0
- 3-Year Limited Parts Warranty

$2999

P5-120XL

- Intel 120MHz Pentium Processor*
- 16MB EDO Performance-Enhanced Memory
- 256KB Pipelined Burst Cache
- 1.62GB 9ms IDE Hard Drive w/ Mode 4 Support
- PCI Enhanced IDE Interface
- ATI Mach 64 Graphics Accelerator with 2MB VRAM
- 4X 3-CD Changer
- 16-Bit Ensoniq® Wavetable & Altec ACS-31 Speakers w/ Subwoofer
- TelePath IIv 14.4K Fax/Modem Communication Center
- 3.5" Diskette Drive
- 17" Vivitron Color Monitor
- 9-Bay Tower Case
- AnyKey Keyboard & MS Mouse 2.0
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional 4.3** Bookshelf & Money 3.0
- 3-Year Limited Parts Warranty

$3999

†Generations Software Collection

■ Microsoft Encarta™ '95 • MS Bob • MS Money 3.0 • MS Works 3.0 • MS Publisher • MS Publisher Design Pack • MS Cinemania®'95 • MS Bookshelf® • MS Composer Collection: Beethoven, Mozart and Schubert • MS Wine • MS Arcade: Missile Command,™ Asteroids,® Tempest,™ Centipede® and Battlezone™ • MS Dinosaurs • Mayo Clinic® Family Health • and Mayo Clinic Pharmacist • plus dozens of popular MS entertainment games.

If you can't find a system that suits your needs, call us and we'll be happy to custom build one for you.

***MS Office Professional 4.3 includes MS Word, Excel, PowerPoint® presentation graphics program, and Access® database.*

Printed on recycled paper with soy inks.

Toll free from Canada
800-846-3609

Toll free from Puerto Rico
800-846-3613

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"You've got a friend in the business."®

8 0 0 - 8 4 6 - 2 0 6 2

†Intel Verified: Upgradable

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International FaxBack Access 605-232-2561 • Component Add-On Sales 800-846-2080 • Sales Hours: 7am-10pm Weekdays, 9am-4pm Saturdays (CDT)

THE BEST OF EXTRAS

Incredible values from Gateway 2000.® Peripherals and software sold only with the purchase of a system.

COMMUNICATIONS & STORAGE

TelePath™ IIv Fax/Modem Communication Center

Revolutionize your communication needs with the TelePath IIv fax/modem Communication Center. Internal fax/modem, 14,400bps modem, V.32bis, with 14,400bps fax capability. The FaxWorks Communication Center sends and receives both faxes and voice messages. Includes a CompuServe® trial membership. **$99**

Colorado Memory Systems® Jumbo 1400 TBU

CMS Jumbo 1400 internal tape backup unit with up to 1.36GB compressed (680MB native) storage capacity per tape. Comes with MS Windows™ and DOS® software, one tape and cable. **$199**

MULTIMEDIA

New 4X Three-CD Changer

Enhance the value and usefulness of your PC with the 4X three-CD changer. It supports multisession photo CDs and XA format, enabling simultaneous audio and data with additional hardware. You'll have access to three times the amount of information of a regular CD-ROM drive and the ability to switch between programs. **$100** *(upgrade from 4X CD-ROM)*

AUDIO MULTIMEDIA KIT

Here's everything you need to add multimedia to a Gateway PC.

- Gateway 2000 16-bit CD-quality sound card, compatible with Sound Blaster™ cards, with MIDI/game port, mic in, stereo line in/out
- 2 Altec™ Lansing ACS-5 speakers

$99 *(with system purchase)*

Wavetable Audio Multimedia Kit

Once you've heard wavetable audio, basic audio will never do!

- Ensoniq® Soundscape™ 16-bit wavetable sound card, MT-32 and FM mode compatible. Supports most software for popular sound cards and standards including General MIDI, Sound Blaster, Adl.ib, Roland MPU 401, MS Windows Sound Sytem and MT 32
- New Altec Lansing ACS-31 three-piece speaker system
- Blue Ribbon Sound Works' SuperJAM! jr. software

$209 *(with system purchase)*
$110 *(upgrade from systems with 16-bit sound card and Altec speakers)*

Kid's Backpack™

Seven exciting software applications designed specifically for kids. Includes Sesame Street® Numbers; My First Incredible, Amazing Dictionary; The Cat Came Back; The Yukon Trail™; Keroppi Day Hopper; Math Blaster®: In Search of Spot; and Sing-Along Kids™. Also includes a 20-disc storage rack and microphone. **$99**

Flight Pack

Seven top-of-the-line flight CDs. Includes TFX™: Tactical Fighter Experiment, Aces Over Europe, Maximum Comanche®, Strike Commander, Privateer, Wing Commander™ Armada; and Warplanes. You also get a joystick and 20-disc storage rack. **$99**

Call the Gateway 2000 special component add-ons division at 800-846-2080 for our complete line of extras for Gateway customers. Sales hours: 7am-10pm Weekdays.

Sports Pack

Six action-packed sports applications. Includes Unnecessary Roughness '95™; Hardball 4™; FIFA International Soccer; PGA Tour® Golf; NHL® Hockey '95; and NASCAR® Racing. Also includes Gravis GamePad™ and CD holder. **$99**

MONITORS

Gateway 17-Inch Vivitron™ Color Monitor

Non-interlaced color monitor using Sony® Trinitron® tube technology, capable of 1280 x 1024 resolution in non-interlaced mode, .26 dot pitch.
Upgrade from a 14-inch CrystalScan® 1024NI monitor **$360**
Upgrade from a 15-inch Vivitron monitor **$260**
(Upgrade prices good only at the time of system purchase.)

PRINTERS

Hewlett®-Packard 4L LaserJet Printer

A full-featured 300dpi printer loaded with enhanced PCL 5 and 26 scaleable typefaces with 1MB standard HP Memory Enhancement Technology. Includes parallel cable. **$559**

Epson® Stylus™ Color Ink Jet Printer

Features 360dpi high-quality print resolution and 720dpi for more brilliant colors on specially coated paper. Exclusive technology produces a precise dot. Includes parallel cable. **$529**

Hewlett-Packard Deskjet 540 Inkjet Printer

Features clear, sharp 600 x 300dpi black printing on plain paper with a variety of built-in typefaces. Color option also available. Includes parallel cables.
$299 (w/out color) **$339** (w/color)

Call for other printer options.

NETWORKING

3Com® Ethernet Adapters

High-performance 16-bit Ethernet cards from the world leader in Ethernet technology.
16-bit Triple Media Card supports BNC, AUI and Twisted Pair media **$109**
16-bit Twisted Pair Card **$89**

SMC® PCI Ethernet Adapter

Supports both Twisted Pair and BNC Media **$149**

National Semiconductor Ethernet Adapters

Infomover™ brand NE2000plus™ Ethernet cards
Triple Media Card w/ 25-foot coax cable **$89**
Twisted Pair only Card **$69**

Gateway accepts most major credit cards and C.O.D. terms, with net 30-day terms and leasing options available to qualified commercial customers. You can also apply for the Gateway 2000 DuoLine™ MasterCard® card, issued by Dial National Bank, Des Moines, Iowa.

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800-846-2062

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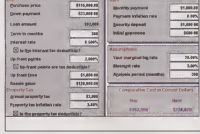
New! SOFTWARE: Prosper

Planning Your Financial Future

Most personal finance software helps you get by but does little to help you get ahead. Ernst & Young's Prosper does just the opposite: It won't automate check printing or bill paying, but it might help ensure that there's enough left over to send little Susie to Stanford when the time comes.



Risky Business: Prosper helps you break down and calculate the costs of important financial moves such as whether to buy or rent a home.

Prosper tracks and summarizes some of the same financial data as a checkbook manager, including your personal balance sheet and budget. Fortunately, you can import much of this data if you're already using Quicken or Managing Your Money. But Prosper also endeavors to learn more about how you handle and spend money, thereby enabling you to establish a risk profile, for example, or set a list of goals such as saving for college, buying a home, or taking an early retirement. The program then helps you act on these objectives with a variety of calculating and research tools.

The calculating worksheets in Prosper go well beyond the usual loan analyzers (although it has those, too). There are attractively laid out calculators for figuring 401(k) plans, pensions, life insurance, and disability. Others let you see the pros and cons of leasing a car, buying or renting a home, and refinancing a mortgage. There's even tax help, with calculators for W-4 exemptions, income tax, and investments.

Prosper can't make you healthy or wealthy, but it just might make you a little bit wiser. CHRIS O'MALLEY

USABILITY: *Organization could be better, but the tailored worksheets are a breeze.* ★★★½
TECHNOLOGY: *With an optimal online link, it's a great tool for both planning and investing.* ★★★★½
VERDICT: *A smart investment for planning your financial future.* ★★★★½

FILEBOX

Prosper

Competition: Jonathan Pond's Personal Financial Planner and Your Best Money Moves (both by Vertigo) cover the bases but aren't as wide reaching as Prosper.

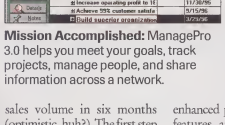
System Requirements: 4MB of RAM, 9MB of hard-disk space, modem for optimal Reuters service.

$69 est. street price
Ernst & Young
(800) 277-6773
Reader Service No. 684

ManagePro 3.0

A Manager's Secret Weapon

Good managers know that great employees are the key to success, but great managers realize that organizing and managing their employees effectively is even more important. Avantos's ManagePro 3.0 is an invaluable tool for setting goals, tracking projects, managing people, and sharing information across a network. In short, it can help you do it all.



Mission Accomplished: ManagePro 3.0 helps you meet your goals, track projects, manage people, and share information across a network.

Loading and using ManagePro is easy, thanks to 20 quick-start job-specific templates and a handy guided tour that walks you through the program's four primary tools: Goal Management, People Management, Support Tools (with handy PIM-like features), and Management Advisor.

Let's say you want to double sales volume in six months (optimistic, huh?). The first step is to refine this goal in a text-based summary table and outline any necessary subgoals, such as checkpoints, progress and performance measurements, delegation of tasks, and to-do items. Monetary fields help you estimate and track project costs, and status updates are a click away in the Goal Timeline view. And with the new MultiLink feature, you can easily share ManagePro databases throughout your organization. ManagePro also includes a flexible report customizer, enhanced project management features, and VIM and MAPI e-mail support.

Think of ManagePro 3.0's networkable blend of project management, people management, collaborative communication, and smarts as an MBA in a box. Any manager who plans to excel should seriously consider it. RICH SCHWERIN

USABILITY: *Easy, intuitive interface; quick start with 20 preloaded manager's templates.* ★★★★½
TECHNOLOGY: *New MultiLink feature shares databases.* ★★★★
VERDICT: *Excellent collection of tools for managing people and projects.* ★★★★½

FILEBOX

ManagePro 3.0

Competition: No direct competitors—yet.

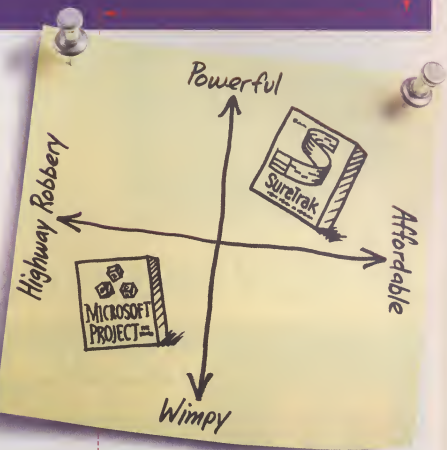
Online Forum: CompuServe (Go: AVANTOS).

System Requirements: Windows 3.1, 8MB of RAM, 17MB hard-disk space.

$199 est. street price
Avantos Performance Systems
(800) 282-6867, (510) 654-4600
Reader Service No. 685

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Everything you need to know about project management software.



You're scrolling through screens. Shuffling cue cards. Wishing Microsoft Project had the power to organize by something as simple as who's responsible for what. But don't give up on project management software. Just think SureTrak Project Manager® for Windows.™

Think power. Other software doesn't take into account delays, changes, or the fact you might want another view of your project. Welcome to the real world. SureTrak shows the plan any way you like. Organize by phase, task, project, or responsibility. You name it. Plus, SureTrak sees a project the way it is—warts and all. So you get the real story, not a naive picture.

Think quick. Only SureTrak has Progress Spotlight.™ Just drag the data date and wham! A graphical to-do list of tasks, deadlines, and who's responsible appears right on your screen. Perfect for recording progress, too.

Progress Spotlight™ gives you a detailed look at upcoming activities.

But the screen isn't the only place SureTrak looks good. Think reporting. Easy-to-manage, colorful, sensible—even multiproject—reporting. SureTrak lets you slice and dice information to emphasize what's most important. And no matter what angle you choose, SureTrak's reporting gets action.

Thinking expensive now? Think again. Microsoft Project lists for $695. So does SureTrak. But you can get SureTrak from Primavera, the project management experts, for the introductory price of just $299.

More powerful. More affordable. SureTrak Project Manager is all you need to know. So think SureTrak. And act now.

PRIMAVERA

How the world says project management

Order SureTrak Project Manager® for only $299. Call 1-800-973-1335.

©1995 Primavera Systems, Inc. SureTrak Project Manager is a registered trademark and Progress Spotlight is a trademark of Primavera. Third-party names and trademarks are property of their respective holders. For inquiries outside the U.S. please fax 801-973-9725.

Circle 198 on reader service card.

New! SOFTWARE: ScreenCam 2.0

All-Singing, All-Dancing Demos

USABILITY: *Captions make the work harder, but the slick, disk-slender results are worth it.* ★★★½

TECHNOLOGY: *Whole-screen movies with optional sound; captions keep file sizes down.* ★★★★

VERDICT: *Fast and effective active demos.* ★★★★

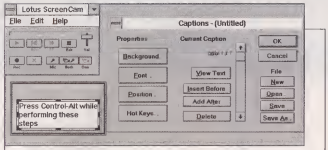
You want to show people how software works. Maybe you're staffing a help desk or making a demo of your own software. Instead of talking them through it yourself—or relying on written words and screenshots—Lotus's ScreenCam 2.0 provides an excellent solution.

ScreenCam captures every event that happens onscreen, along with a soundtrack to narrate your steps, and drops it all into a self-contained demo file. And you can make a ScreenCam SCM file into a self-playing EXE file that will run on any Windows system.

If you want to keep file size to around 1MB per three minutes, you can skip audio narration altogether and add multiple text captions to describe what you're doing. This process is a little more cumbersome than recording and narrating, but the slim file sizes are often worth the extra effort.

Still, one limitation remains: ScreenCam movies cannot be edited. You get only full-screen playback, and if you make a mistake during your demo, you have to start over. To see what you can do with ScreenCam, download ScreenCam EXE files from PC Contact (see page 298 for instructions). If that's the kind of thing you could use, ScreenCam is your tool.

MATTHEW LAKE



Silent Subtitles: To keep your ScreenCam 2.0 movies small, use captions instead of voice narration. Pick your caption box and type in your own text.

FILEBOX

ScreenCam 2.0

Competition: Motion Works' $149 CameraMan for Windows produces editable AVI files of just portions of a screen, but ScreenCam's files are much more compact.

System Requirements: Windows 3.1, sound card, and microphone for recording narration.

579 est. street price
Lotus Development Corp.
(800) 343-5414
Reader Service No. 686

1-800-238-7272

Para Systems, Inc.
1455 LeMay Drive
Carrollton, Texas 75007
214/446-7363
Fax: 214/446-9011

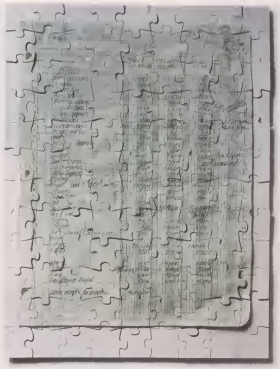
Product and company names mentioned herein may be trademarks or registered trademarks of their respective companies.

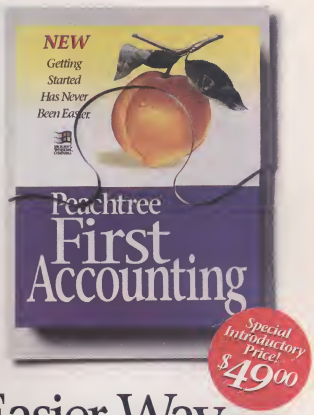
BEFORE YOU BUY A UPS COMPARE...

Smart purchasing decisions are made based on facts, whether you're buying a car or a UPS. Before you buy a UPS, take a few seconds to make the comparison yourself. The facts will show that Minuteman's Alliance Series provides more features for less money. It's as simple as that.

To further stand behind our promise of more features for less money, Minuteman has established an industry-leading 10-part Smart Buyer Program that will provide you with a price protection guarantee, a competitor's trade-in discount plan, free technical support, along with other important guarantees. To top it off, we'll even beat any competitor's price on an equivalent VA-rated line-interactive UPS. Call our Power Hotline now for more detailed information on our Smart Buyer Program. Be smart, buy smart ... and make sure it's a Minuteman UPS.

Circle 148 on reader service card.





There's An Easier Way To Do Your Accounting.

It's one thing to use your PC for memos and letters. And quite another to trust it with the lifeblood of your business – your accounting.

Maybe that's why so many business owners cling to pencil and paper, or try to get by with personal finance software.

Well, we're out to change all that. Starting today.

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New Peachtree First Accounting was created to take the anxiety out of accounting for first time users.

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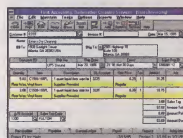

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System Requirements: IBM Compatible 386 or higher, Windows 3.1 running in standard or enhanced mode. 4 MB RAM, 12 MB free hard disk space, VGA or higher monitor, mouse. Works with any Windows 3.1 compatible printer.

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Circle 232 on reader service card.

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Circle 110 on reader service card.

Net SatisFaxtion vs. FaxWare

Fax Forward on the Network

Networks are for sharing—sharing data, sharing software, and sharing printers. Why not share fax modems as well? If you're tired of the lines at the office fax machine, consider the new network fax solutions from Intel and Tobit.

Intel's Net SatisFaxtion and Tobit's FaxWare both let you send and receive faxes from your workstation using one or more shared modems on a NetWare network. Both also come bundled with fax software or let use your own favorite program. But Net SatisFaxtion surpasses FaxWare with an easier installation and hassle-free use at a lower price.

I Can't Get No . . . Net SatisFaxtion's Windows-based client software provides automatic retrieval from the server, along with notation tools, an optical character recognition (OCR) engine for converting received faxes to searchable text, and a cover-page editor. All of the modules include an easy-to-learn interface that's quick and smooth to use.

With Net SatisFaxtion, your supervisor or network administrator can schedule fax sending sessions, monitor operations, and distribute incoming faxes electronically. And if your office phone system has Direct Inward Dialing (DID), Net SatisFaxtion can automatically route faxes to the recipient's desktop extension via DID.

Net SatisFaxtion works right out of the box because it supports only Intel's SatisFaxtion fax modems and GammaLink's GammaFax boards. This can be limiting, but it avoids most of the installation headaches you'll find in competing products like FaxWare. Every brand of fax modem has its own peculiar initialization string, and many network fax packages often get them confused.

Setup Stumbling Blocks FaxWare supports a long list of Class 2 fax modems, but not all of them. For example, it doesn't support U.S. Robotics' popular Courier V.Everything, which is Class 2.0 (there are subtle differences between Class 2 and Class 2.0 modems). And even if a modem string is included in FaxWare, you'll be in for some awkward trial-and-error tweaking to get it working if the installation program fails to provide the proper commands. Unfortunately, the documentation provides little help.

Like SatisFaxtion, FaxWare requires a Novell NetWare network and includes both DOS and Windows client software. But FaxWare doesn't support drag-and-drop faxing, and the administrator's tools lack the full routing control and polished interface of those in Net SatisFaxtion.

Overall, Net SatisFaxtion meets with our approval for network fax sharing. It combines an easy, reliable installation with an attractive and powerful interface, benefiting both user and administrator. On smaller networks, FaxWare is acceptable, with lighter hardware demands and greater modem flexibility. But be prepared for a tough installation process, including some one-on-one time with the NetWare interface. DENNIS FOWLER

Net SatisFaxtion

USABILITY: *Easy installation, simple interface, excellent documentation.* ★★★★½

VERDICT: *Solid package for sharing fax modems over a network.* ★★★★

FaxWare

USABILITY: *Awkward and unpleasant installation, fair documentation.* ★★

VERDICT: *Installation woes make for a barely acceptable network fax solution.* ★★½

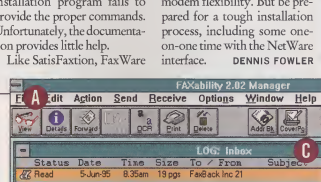
FILEBOX

Net SatisFaxtion

$1,195 est. street price for 25 users, $1,995 for 1,000 users
Intel
(800)538-3373, (503) 264-7354
Reader Service No. 687

FaxWare

$1,490 est. street price for 5 users
Tobit Software Int'l
(800) 468-6248, (408) 982-2562
Reader Service No. 688



A. The **View** button brings up Net SatisFaxtion's fax viewer and loads the fax for reading, cleaning up, or annotating.

B. Convert faxes via OCR to simple ASCII text files or one of 30 other formats.

C. The **Cover Page** designer lets you call up an existing design and customize it to your needs. There are numerous tools to design your own cover page as well.

Net Fax Secrets: Managing your incoming faxes is a simple one-button process with Intel's Net SatisFaxtion. In its Faxability Manager, you can automatically retrieve faxes forwarded to your folder for viewing, converting to editable text, or annotation. By contrast, faxes in Tobit's FaxWare (not pictured) are sent and received through a DOS interface using key commands chosen from its menus.

Faxable Tools: A complete set of tools for annotating faxes is a click away in Net SatisFaxtion's Viewer. It lets you cut and move objects, underline text, and annotate with boxed or free-form text.

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Server Safety Net on a Budget

Fault tolerance: It's a goal that every network administrator must strive for. But until recently, true server fault isolation and recovery was an elusive prize. Existing technologies like redundant array of inexpensive disks (RAID) and disk mirroring address only the mass storage angle. What if the server's system board fails, or the power supply?

The only solution has been Novell's pricey NetWare SFT III, which mirrors servers in real time for continuous failure protection. But thanks to Vinca's new StandbyServer, network administrators now have an economical alternative to Novell's offering.

Next Best Thing StandbyServer is a combination software/hardware product that provides not-quite-real-time backup for an existing NetWare server. It works by creating a link between the NetWare server and the StandbyServer system via a pair of high-speed serial adapters. It then patches the NetWare disk driver so that it can "see" disk drives on the StandbyServer system, which appear to it as compatible disk partitions. NetWare's built-in disk mirroring capabilities are then used to mirror the server's partitions to the backup disk(s) in the StandbyServer system, thus creating a real-time duplicate of critical server data.

The StandbyServer can be any NetWare-compatible 386 or 486 system with enough mass storage space (disk drives, RAIDs, and so on) to hold the mirrored NetWare volumes, as well as enough RAM to load the file system and to cache the directories under NetWare.

During normal NetWare server operation, StandbyServer runs a DOS-based monitoring program that services requests from the NetWare disk driver and updates the backup hard disk(s) accordingly. In the event of a server failure, you shut down the monitoring software, then reboot the StandbyServer system under Novell NetWare. Once booted, NetWare loads the backup volume just like the original. Users on the network can immediately resume work.

A Flexible Solution The chief benefit of StandbyServer is its relatively low cost. Unlike NetWare SFT III, you don't have to duplicate your entire NetWare server configuration component by component. All you need is a system with enough RAM and hard-disk space, as well as network interface cards to service all of your cabling. Another plus: StandbyServer doesn't require a second NetWare license because NetWare is running on only one server at any given time.

Finally, the flexibility of having a real-time, bootable backup of your NetWare server makes it easier to perform routine server maintenance. Need to take down your primary server for a while? Simply bring up the StandbyServer and let your users continue to access their files and print services while you maintain the NetWare box. The quick turnaround (it took us only 10 to 20 minutes to switch systems, even on our first try)—and the fact that NetWare can resynchronize mirrored volumes on the fly—give the weary network administrator another option for making life easier.

Overall, StandbyServer is a great idea. If you're considering NetWare SFT III, take a look at StandbyServer first. It may be all the protection you really need. **RANDALL C. KENNEDY**

Effective Backup: If you don't need instantaneous server backup, consider Vinca's StandbyServer before you invest in Novell's powerful but expensive NetWare SFT III. You can turn any 386 or faster system into a StandbyServer using a pair of ISA (shown here), EISA, or MCA add-in cards.

PICKS NET PROTECTION

Absolute but expensive real-time server recovery	Novell NetWare SFT III
Timely, economical access to backup server data	Vinca StandbyServer

Fast Recovery: NetWare SFT III is still the only solution for real-time continuous fault protection. If you don't need instantaneous recovery, however, StandbyServer is a cost-effective alternative. In the event of failure, getting the network back up is easy.

Standby Server

USABILITY: *Complex configuration, NetWare-savvy administrator required.* ★★★

TECHNOLOGY: *High-speed serial adapters create a real-time duplicate of critical server data.* ★★★★

VERDICT: *An inexpensive alternative to true mirrored (SFT III) server backup technology.* ★★★★

FILEBOX

StandbyServer

Competition: Novell's NetWare SFT III provides real-time server backup, but at a significantly greater cost.

Minimum System Requirements: 386 CPU, 512K of RAM, 1MB of hard-disk space, DOS 6.0 (will not work with DR DOS 6.0).

Features (as tested): Two 486 systems, each with 8MB of RAM, a 500MB IDE hard drive, and Novell NE-2000 network adapters.

$1,695 est. street price (two ISA cards), $1,995 (two EISA cards), $1,995 (two MCA cards)
Vinca
(800) 934-9530, (801) 223-3100
Reader Service No. 689

PHOTOGRAPHS BY ARNOLD TORSO

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

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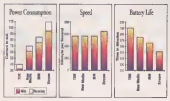

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Circle 206 on reader service card.

Logbook LONG-TERM TESTS: OfficeJet • Sidekick 2.0 for Windows

Fax It, Print It, Covet It

I lock my office door when I leave work each night. It's not that I don't trust my coworkers, it's just that I understand the appeal of Hewlett-Packard's OfficeJet and can't fault the jealousy of others. For eight months I've enjoyed HP's outstanding printer/fax/copier hybrid, and I can't bear the thought of returning my evaluation unit (which is why I volunteered to review HP's forthcoming OfficeJet LX with a built-in scanner, but that's another story).

The OfficeJet easily saves me 15 minutes a day. Before its arrival, I shared a fax and copier in different corners of the building and put up with delays, paper jams, and the intra-office transit. Now I have an all-in-one device within arm's reach at my desk.

I use the OfficeJet's ink-jet printer occasionally, but not often. There's nothing wrong with it; I just prefer the laser printer on the network. Pages emerge faster, and laser output is crisper than ink-jet copies. Besides, it gets me out of my office once in a while. The OfficeJet can photocopy pages, too, but it's not designed to handle more than a few copies at a time.

My favorite feature of the OfficeJet is its built-in fax. And since it multitasks, it can print and send a fax at the same time. I also like having a "private" fax number. Unsolicited junk faxes go to the main fax number, while the faxes I specifically request are sent to my OfficeJet.

The OfficeJet LX promises to be even better: It adds a scanner and lets you fax directly from Windows (this version faxes only hard copies of documents). But for now, I'm still keeping my office door locked. RICH SCHWERIN

OfficeJet / Hewlett-Packard / (800) 538-8787 / $600 est. street price / *Reader Service No. 696*

Logbook Entries:

December 6, 1994: *After a month of using the OfficeJet, I place my first tech-support call about a memory error message that appeared when I received an ultra-large fax on the OfficeJet. Two minutes of troubleshooting later, I'm back in business.*

February 14, 1995: *I receive a personal Valentine's Day fax on my personal OfficeJet. That never would have happened on the network fax machine.*

March 1, 1995: *Zap! HP recalls a small number of OfficeJets because of potential electrocution problems. Luckily the serial number on my unit is not among those recalled: US4B1 to US4B9, US4C1 to US4C9, US4BA to US4BU, and US4CA to US4CK.*

Logbook Entries:

December 21, 1994: *I hear there's a new version of Sidekick for Windows. I like no-clutter interfaces. One small annoyance: As I enter contact names into a new card, I can't tab through the fields from last name to first name and so on. I have to use the arrow keys or Enter.*

February 9, 1995: *I like Sidekick's wine database. I can mimic it for my own music and restaurant databases. Unfortunately, it doesn't support OLE.*

April 6, 1995: *I'm surfing on the Web and come across the Starfish Web page at http://www-.simplify.com/simplify—good to know. The best free support option, TechFax, faxed me a catalog minutes after I called.*

Sweet and Simple

When it comes to PIMs, the simpler, the better. When I need a phone number or other contact information, I'm usually on the phone or doing six things at once. I don't want to negotiate multilevel button bars and cascading menus. That's why I gave Sidekick 2.0 for Windows a shot. It's compact (when was the last time you loaded a Windows program from a single disk?), inexpensive, and doesn't tie up system resources with elaborate networking features and convoluted outlining views.

It's also consistent. Large icons for Cardfile, Calendar, and Notes sit on the top right of the screen and never move (so I never have to search for them). On the left side of the screen, the phone book offers separate tabs for each letter in the alphabet. On the right side sits the card entry I've called up. And below that I've maximized the To Do list so I always know what tasks have eluded my attention. I'm also addicted to seeing a thumbnail monthly calendar while scheduling my daily appointments.

Attaching a note to a contact entry is not as intuitive as it could be. The big Notes tab displays notes about each contact, but I'm always hunting for the Instant Note button. Fortunately, Sidekick more than makes up for this shortcoming with usability touches like multiple customizable Cardfiles that let me keep my business contacts, social contacts, and CD collection as separate databases.

I've seen and tried dozens of information managers, but so far only Sidekick 2.0 for Windows simplifies my life without reengineering it. JAMES OLIVER CURY

Sidekick 2.0 for Windows / Starfish Software / (800) 370-8963 / $49.95 est. street price / *Reader Service Number No. 697*

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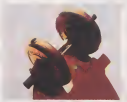

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The IBM PC 700 at a glance

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ZD

The Desktop Superguide

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SOUND CARDS: *For your multimedia.* **162**

MODEMS: *28.8Kbps is the new standard.* **166**

Buying hardware today is harder than ever. With prices dropping and products improving, you might think it would be simple. It's not. True, it seems harder to go wrong—the quality of today's products easily surpasses even last year's, and your purchase order will probably be no larger. But you're being asked to do more with less money. You don't have the resources to research a dozen vendors and receive competitive bids. You don't have the budget to make a mistake. It's imperative that you know whether the money you save when you buy a product is going to evaporate when you have to spend a week setting it up or an hour waiting for it to process a job.

PC Computing is about to make your life easier. We've done the research and compiled the bids. We've evaluated over 100 products—systems, printers, CD-ROM drives, scanners, sound cards, and modems—and singled out the best of the best. Each product underwent extensive performance and usability testing in our labs. We then combined these performance and usability test results with evaluations of the products' technologies, prices, and key features. The result is this comprehensive hardware superguide.

Of course, progress never stops. Our testing here was limited to shipping products that were widely available as of our testing deadlines. By the time you read this, you'll be able to choose from many systems by Gateway 2000, Dell, Micron, Polywell, and Tagram that are built on Intel's new 120MHz Pentium. And you may be interested in Hewlett-Packard's LaserJet 5P, a printer that raises the bar in desktop laser performance.

In each category we rated price, features, performance, usability, and technology. The verdict reflects how our staff experts weighted these factors, with the top score garnering a *PC Computing* Best award. While all of the categories had standout products, we know that your needs are unique. Turn to the Decision Makers at the end of each section for a guide to the particular product that's right for you.

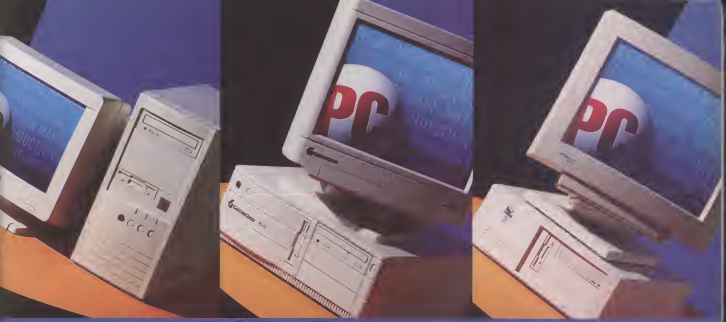
BY THE PC COMPUTING STAFF

A SYSTEMS: Our top picks were Micro Express's MicroFlex-PCI/66G, the Gateway P5-75, and Tagram's Thunderbolt.

B PRINTERS: We tested the best monochrome, budget color, and high-end color printers; standouts were Lexmark's Optra R and Tektronix's Phaser 340 and Phaser 140.

C PERIPHERALS: Load your system—Creative Labs' Sound Blaster AWE32, Motorola's V.3400, HP's ScanJet 3c, and CD-ROM drives from Toshiba (top) and Plextor are all good bets.

PHOTOGRAPHS BY MARK JOHANN



To choose the right **system, printer,** or **peripheral** for you,

turn to our **Decision Maker** at the end of each section.

Systems: Power for Peanuts

You don't need a sledgehammer to tap in a few nails. And you don't need a 100MHz Pentium for light clerical tasks. Matching the right tool to the job is your key to efficient productivity and sound investment in your hardware.

To take the guesswork out of this crucial choice, *PC Computing*'s usability and performance labs subjected over 40 systems to intensive testing, and ranked them in three system categories defined by user needs: high-end, midrange, and entry-level.

Computation-intensive graphics and database programs need the most powerful PCs money can buy: 90MHz and 100MHz Pentiums, packed with fat hard drives and plenty of multimedia extras. With so many of the 100MHz machines running neck-and-neck, the final verdict depended on extras like surplus drive bays and add-in card slots, warranties, and, of course, cost.

If you use applications like spreadsheets or databases for sophisticated business tasks like decision support or sales projections, then consider one of the meaty 60MHz or 75MHz Pentiums, or the 100MHz 486DX4 systems we tested. The right balance of hardware components and subsystems is the key to maximizing performance. But the right operating system is also critical. Most notably, Compaq's choice of Windows 3.1 instead of Windows for Workgroups dragged its systems' performance down.

For basic productivity applications—e-mail, word processing, and PIMs—we looked at 14 systems built around a 66MHz 486DX2 processor, the absolute minimum CPU required for today's graphical programs. While usability and expandability were obviously critical factors, we also emphasized price and performance—essential considerations for users who need to stretch their support dollars as far as possible.

As our tests revealed, price and performance aren't necessarily at odds with each other. And with tumbling hardware costs brought to you courtesy of the PC price wars, it's now possible to put a lot of computer on your desk without busting the budget. But price and performance should not overshadow usability in any purchase decision. Finding the right alchemy of power, feature set, usability, and price in a system can be exasperating. But the pages that follow will make your search easier. SHYAMALA REDDY

Best Among Equals: Tagram's blistering Thunderbolt edged out machines from Gateway and Polywell.

Money Matters: Gateway's P5-75 topped its category, thanks to a low price—hundreds less than most others.

Budget Ace: The MicroFlex not only topped most of the performance tests, it was also the lowest-priced of the lot.

What to Look For

Monitor The 15-inch monitor is in its heyday now, but our usability testing has shown that you can get far more done with a 17-inch monitor. Consider 17 inches a starting point, and even entertain 20- and 21-inch dreams.

Usability [illegible]

Memory Our testing shows time and again that Windows likes 16MB of RAM. You can get by with 8MB, but upping your RAM to 16MB can mean the difference between decent performance and flying.

CPU One of the best ways to guarantee high performance from your system is to purchase a fast CPU. Right now, you can get 66MHz 486 systems for $1,000. Even 90MHz and 100MHz Pentium systems are around for just over $3,000. They're worth the money.

Storage Your hard disk and CD-ROM drive are key to keeping data around your PC. Make sure your hard disk supports seek times of 10ms to 12ms. Your CD-ROM drive should be able to beat a 200ms access time and keep up a 300KBps transfer rate (if you have a few extra bucks, go for 600KBps).

High-End PCs: Speed Demons

Executive Summary

Four systems—Tagram's Thunderbolt, Gateway 2000's P5-100XL, Polywell's Poly 5100D2, and IBM's Personal Computer 750—were clear winners in performance tests. They also performed well in usability—with all but the Poly 5100D2 earning the Usability Seal of Approval. This is no small feat given that all the machines we tested came fully loaded. For high-end number crunching, graphics, and page layout, the four systems that emerged should be primary in your purchase decisions.

If you want a no-compromise, supersonic, desktop rocket, you've come to the right place. We requested systems that would make any power-hungry database, spreadsheet, or graphics application fly, with at least a 90MHz Pentium CPU, 16MB of RAM, at least a 20-inch monitor, a minimum of 2MB of RAM on the video card, and a sound card. We left it up the vendors whether they met or exceeded these specifications. We received and tested 14 systems, based on either 90MHz and 100MHz Pentiums. The average performance ranged from fast to blistering. The prices, too, cover an impressive range: from under $3,500 to over $5,000.

Highlights With only one exception, even the slowest 100MHz Pentium is faster than the fastest 90MHz model. Not surprisingly, our top finishers—Tagram's Thunderbolt, Gateway 2000's P5-100XL, IBM's Personal Computer 750, Polywell's Poly 5100D2, and Zeos's Pantera 100 are 100MHz Pentiums.

The Thunderbolt, P5-100XL, Pantera 100, and Personal Computer 750 ran neck-and-neck in most of our performance tests. Why did the Thunderbolt win? The usable design of its desktop enclosure.

Expandability was another key for many of these systems. The Thunderbolt may hold a low price edge, but Gateway's P5-100XL has the edge in space—a big edge. Even with a hard drive, floppy, and CD-ROM drive, its tower has seven available drive bays. All that space helped earn the P5-100XL four stars in usability plus our Usability Seal of Approval.

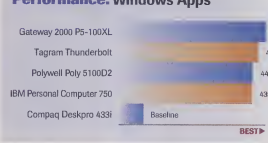
Thunderous Applause: Tagram's Thunderbolt turned in high performance and usability results, and has four PCI slots.

When we look away from performance numbers, we see that CompuAdd's CP90p turned in some incredible usability results. While the CP90p's 90MHz CPU performed below the 100MHz machines, it still performed well. And testers noted the excellent documentation with helpful diagrams and clean design as top features.

Lowlights While all eight of the 100MHz Pentiums performed well, the same can't be said about all of the 90MHz systems. Taking up the rear were AST's Premmia GX/P90 and Compaq's Deskpro XL 590. The Premmia ran slightly faster but also suffered from a limping hard disk. While certainly fast, neither PC takes full advantage of its CPU.

Because of the cut-off date on our testing, there are some notable omissions from the high-end category, such as the 120MHz Pentium-based systems from Dell, Gateway, and Tagram. But you can still get amazing performance from a 100MHz Pentium. And when you're pushing the desktop envelope, don't settle for anything less. ADAM MEYERSON

Performance: Windows Apps



NOTE: WINSTONE 95 IS A BENCHMARK THAT RUNS 13 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

Rating High-End Systems

Product	Price	CPU Speed	RAM	Disk	Performance	Usability	Technology	Verdict
Thunderbolt Tagram System *Reader Service No. 750*	$3,945	100 MHz	16 MB	1GB	★★★★★ Tied with Gateway's P5-100XL for top performer. Fastest hard disk.	★★★★½ Case is solid, jumpers accessible, clean inside.	★★★★½ Four PCI slots, 1MB CPU cache, Diamond multimedia card.	★★★★★ Faster than a speeding bullet at an amazing price.
P5-100XL Gateway 2000 *Reader Service No. 751*	$3,799	100 MHz	16 MB	1GB	★★★★★ Best overall in Windows—fastest CPU in the bunch.	★★★★ Simple upgrades with room to spare.	★★★★ Enhanced IDE, quad-speed CD-ROM.	★★★★½ Speed to spare, easy to service.
Pantera 100 Zeos Int'l *Reader Service No. 752*	$3,795	100 MHz	24 MB	1GB	★★★★ Fastest graphics; strong Windows performer.	★★★★ Tons of space to work with.	★★★½ Basic, except Turtle Beach sound card.	★★★★ Fast, with room to grow and a good price.
Personal Computer 750 IBM *Reader Service No. 753*	$5,230	100 MHz	16 MB	1GB	★★★★½ A length behind Gateway's; disk took second.	★★★★ Excellent setup software, easy-access case.	★★★★½ 1MB Level-2 CPU cache, Enhanced IDE.	★★★★ Great speed and no compromises.
Poly 5100D2 Polywell *Reader Service No. 754*	$4,995	100 MHz	32 MB	1GB	★★★★½ Snappy graphics and fast at Windows.	★★★½ Case removal is a puzzle, web of cables.	★★★ Mediocre, except Diamond video and Creative Labs sound.	★★★★ Plenty of speed.
AcerPower Pentium 100 Acer *Reader Service No. 755*	$3,995	100 MHz	16 MB	1.2 GB	★★★ Average at Windows.	★★★½ Locking case. Slot shortage because of daughtercards.	★★★½ Quality quad-speed CD-ROM, ATI Mach64 video.	★★★½ Good price, but slow.
Celebris XL 590 Digital Equipment Corp. *Reader Service No. 756*	$4,399	90 MHz	16 MB	1GB	★★★ Windows is relatively slow.	★★★★ Solid feel, SIMMs snap in easily. Schematics are frustrating.	★★★½ Solid Diamond Stealth video and Toshiba CD-ROM.	★★★½ Easy upgradability, but not a speed demon.
CP90p CompuAdd *Reader Service No. 757*	$4,100	90 MHz	16 MB	1GB	★★½ A relatively slow CPU holds it back.	★★★★½ Great documentation, and case gives easy access.	★★★½ Top-notch: Diamond Stealth video, quad-speed CD-ROM.	★★★½ Not a racer, but easy to service.
Dimension XPS P100 Dell *Reader Service No. 758*	$4,149	100 MHz	32 MB	1GB	★★★½ Graphics above average, middle range in Windows.	★★★★ No-tools cover removal, good manuals.	★★★★ To the edge with 128-bit Number Nine graphics.	★★★½ Decent performer, easy to service.
Evolution V ST/90 ALR *Reader Service No. 759*	$4,569	90 MHz	16 MB	1GB	★★★½ Fast hard disk.	★★★½ Tough to remove cover. Nice autoconfig BIOS.	★★★★ Sound Blaster with onboard SCSI.	★★★½ Needs a speed boost and is a bit pricey.
Deskpro XL 590 Compaq *Reader Service No. 760*	$3,699	90 MHz	16 MB	1GB	★★ Hard disk hampered by lack of 32-bit disk access.	★★★★ Good online help system. Tough to get inside.	★★★½ Old operating system; no 32-bit access.	★★★ OK price but performance lacks.
Image P90 NEC *Reader Service No. 761*	$3,419	90 MHz	16 MB	1GB	★★ A P90 doesn't get much slower in Windows.	★★★★ Slots are accessible; SIMMs snapped right in.	★★★½ So-so, except fine quad-CD and nice NEC monitor.	★★★ Snoozy Windows performance, but priced right.
PCI P100 MM Insight *Reader Service No. 762*	$5,099	100 MHz	16 MB	1GB	★★★★ Balanced performer in Windows, disk, and video.	★★★ Manuals won't help, SIMMs hard to access.	★★★ Mediocre, except Diamond Stealth video.	★★★ Good performer but a bit pricey.
Premmia GX P/90 AST *Reader Service No. 763*	$4,320	90 MHz	16 MB	1GB	★★ CPU held back by graphics and hard disk.	★★★★ Big thumb screws you can't lose, built-in SCSI.	★★★★ Save slots with embedded SCSI and Ethernet.	★★★ Just too slow to be a 90MHz Pentium.

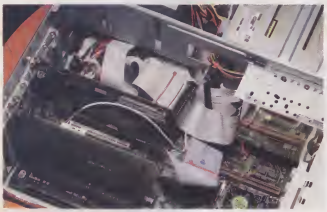
Usability Notes: High-End PCs

You went for the big gun—the 100MHz Pentium. It's a big investment, but if you buy a usable system it will grow to meet your needs. To find out which systems were the easiest to open and service, we brought upgrade-savvy *PC Computing* readers into the *PC Computing* Usability Labs to examine high-end Pentium systems for expandability.

If you plan to upgrade or even repair your system, then getting the cover off would seem pretty important. Dell's Dimension XPS P100 and AST's Premmia GX/P90 both make it easy by using large thumb screws that come off without tools. If upgrading your CPU or adding SCSI peripherals is important, then AST's Premmia GX/P90 will score points with you: It has built-in SCSI and a second Pentium socket.

Once inside, we had our testers replace SIMMs. In ALR's Evolution VST/90, AST's Premmia GX/P90, CompuAdd's CP90p, Digital Equipment Corp.'s Celebris XL 590, and NEC's Image P90, the SIMMs snapped into place easily. Special mention goes to Tagram's Thunderbolt: All the cables were neatly folded and bound, making it a pleasure to work on.

Once the new SIMMs were installed, our testers powered up the systems. Extra credit goes to the machines from CompuAdd and ALR, which automatically recognized and configured the newly added memory. In addition, CompuAdd's detailed manuals were a standout. ADAM MEYERSON



Details, Details: Take Tagram's Thunderbolt: In a standard desktop case, Tagram's design provides four ISA slots, four PCI slots, two available drive bays, and plenty of room to work. The neatly folded and bound cables help maximize available space.

Cool, No Tools: You paid good money for your computer, and you should be able to get inside it without a jackhammer. With IBM's Personal Computer 750, you won't need any tools at all—just flip the latch and slide the cover off.

Usability Seal of Approval

Expandability is key in a high-performance system, but equally important is how easily components slide into place. Ten of the fourteen systems tested earned our Usability Seal.

- **Celebris XL 590** Digital Equipment Corp.
- **CP90p** CompuAdd
- **Deskpro XL 590** Compaq
- **Dimension XPS P100** Dell
- **Image P90** NEC
- **P5-100XL** Gateway 2000
- **Pantera 100** Zeos Int'l
- **Personal Computer 750** IBM
- **Premmia GX P/90** AST
- **Thunderbolt** Tagram System

Close Quarters: Even an enormous tower case can't make Insight's PCI P100 MM system easy to work on. Once you manage to fight your way through a cabling blockage, you'll find the SIMMs are hidden behind a drive bay that has to be removed before you can add RAM.

Less than Meets the Eye: Look under the hood of Acer's AcerPower Pentium 100 and you'll find at least two wasted slots: the first is lost to the IDE controller—which really should be part of the motherboard—and the other is taken up by a tiny card that is attached to the IDE controller.

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Midrange PCs: Budget Power

Executive Summary

Gateway 2000's P5-75 Family PC didn't win any of the performance tests, but it edged out the speedier competition thanks to one of the lowest price tags in the pack. Not that this is a clunker—it tied for second in overall Windows application tests, behind Insight's PCI 75MM. And it came in third in video tests behind Zeos and CompuAdd machines. When budget realities temper your need for raw speed, all these systems offer excellent performance.

The signs are unmistakable. Once you used your PC primarily for e-mail and the occasional letter, now you're immersed in a world of spreadsheet calculations, database queries, chart building, sales analysis, and data mining. What was once a convenience is now an essential competitive edge. Face it: You're a power user. Now all you need is a machine that can keep up with you—and your mounting workload.

Look no further. We tested over a dozen midrange machines designed with you in mind. We specified systems with a processor not below a 100MHz 486 DX4 but not above a 75MHz Pentium, a disk drive from 500MB to 1GB, a 17-inch monitor, and 16MB of RAM. The vendors could choose what speed CPU and what size hard drive to include.

Most of the contenders proved to be extremely fast, thanks not only to their high-speed CPUs—11 out of the 14 systems housed a 75MHz Pentium—but due to fat external caches and Windows for Workgroups 3.11's 32-bit file and disk access, as well. Speed is only half the story; all the machines came well stocked with peripherals and extras, all handy for working simultaneously with multiple applications.

Highlights The speed wars were dominated by Insight's PCI P75 MM, which consistently bested the competition in our overall Windows application and disk subsystem tests, and also placed well in our video tests. The only thing that kept it from sweeping the midrange category was its rather steep price tag.

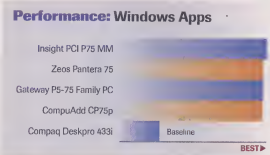
Big Bang for Small Change: Not the fastest, but dollar value gives Gateway's P5-75 Family PC the competitive edge.

Lowlights Not surprisingly, the three machines that lacked screaming 75MHz Pentium processors—Compaq's Deskpro XE 4100, Polywell's Poly 486-100 VP4 (both with 100MHz 486DX4 chips), and AT&T's Globalyst (which sported a 60MHz Pentium)—consistently ranked at the bottom in performance tests. In fact, the Deskpro XE 4100 was actually slower than our baseline machine, a 33MHz 486 Deskpro, in our disk subsystem test. That said, the prices of the Poly 486-100 VP4 and the Globalyst are excellent compared to most of the 75MHz Pentium-based systems.

The testers agreed that all the speed leaders had certain features in common beyond a 75MHz Pentium. When shopping for a workhorse machine, you should also look for a 256K secondary CPU cache, Windows for Workgroups 3.11, and a 64-bit video card with 2MB of RAM. If price outweighs all other considerations, then consider Polywell's Poly 486-100 VP4—it's slow but solid. And at $1,995 it's cheaper than many entry-level systems.

SHYAMALA REDDY

Performance: Windows Apps



NOTE: WINSTONE 95 IS A BENCHMARK THAT RUNS 13 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

Rating Midrange Systems

Product	Price	Hard Drive > 1,000MB?	PCI Bus?	256K Cache?	Performance	Usability	Technology	Verdict
P5-75 Family PC Gateway 2000 *Reader Service No. 764*	$2,299	No	Yes	Yes	★★★★ Fast Windows, smoking graphics, and a good hard disk.	★★★★ Roomy case allows for easy upgrades.	★★★★ Enhanced IDE, quad-speed CD, PCI, and ATI Mach 64.	★★★★½ Speed demon at a great price.
Pantera 75 Zeos Int'l *Reader Service No. 765*	$3,495	Yes	Yes	Yes	★★★★½ Great Windows performer, fast graphics.	★★★★ Roomy case and lots of drive bays.	★★★★ Turtle Beach sound, Diamond Stealth video, PCI.	★★★★ Fast, with room to grow.
PCI P75 MM Insight *Reader Service No. 766*	$3,399	No	Yes	Yes	★★★★★ Tops in Windows tests; fastest hard disk.	★★★ Weak documentation and obstructive layout.	★★★★ Diamond video and sound, PCI, and Enhanced IDE.	★★★★ Plenty of power but a service challenge.
Power System 75 IPC Austin *Reader Service No. 767*	$2,999	No	Yes	Yes	★★★★ Good Windows performer with fast CPU and graphics.	★★★½ No-tools cover removal, roomy case, but inaccessible SIMMs.	★★★★ Diamond video and sound, quad-speed CD.	★★★★ Above average speed at an affordable price.
AcerAcros Pentium 75 Acer *Reader Service No. 768*	$3,499	No	Yes	Yes	★★★½ Held back by relatively slow graphics and CPU.	★★★★ No-tools cover removal, and a roomy case.	★★★★ ATI Mach 64 graphics, sound, PCI disk controller.	★★★½ Not a barn burner, but it's well designed.
Dimension XPS P75 Dell *Reader Service No. 769*	$2,043	Yes	Yes	Yes	★★★½ Average Windows scores helped by speedy hard disk.	★★★★ Good documentation, but ill-fitting card slots.	★★★★ Sound Blaster, Number Nine graphics, PCI.	★★★½ Middle-of-the-pack Windows performance.
Elite P5-75 Office PC MidWest Micro *Reader Service No. 770*	$3,099	No	Yes	Yes	★★★½ Held back by relatively slow graphics and CPU.	★★★ Obstructive design and only one free ISA slot.	★★★★ ATI Mach 64 graphics, sound, PCI, NEC CD-ROM drive.	★★★½ Average performer, tough to service.
Celebris 575 Digital Equipment Corp. *Reader Service No. 771*	$2,717	No	Yes	Yes	★★½ Comparatively slow graphics and hard disk.	★★★★ Confusing documentation, good layout.	★★★ Small and slow hard drive, archaic graphics.	★★★ Too slow for today's applications.
CP75p CompuAdd *Reader Service No. 772*	$3,304	No	Yes	Yes	★★★★ Fast graphics move Windows along.	★★★★½ A winner. Great documentation, smart design.	★★★★ Diamond video and sound, quad-speed CD.	★★★ Most usable design.
Evolution V ST/75 ALR *Reader Service No. 773*	$2,723	No	Yes	Yes	★★★ Comparatively sluggish Windows performance.	★★★½ Case removal a struggle, but a nice autoconfig BIOS.	★★★½ Orchid Kelvin 64 graphics and sound, dual-speed CD-ROM drive.	★★★ Average performer but easy to upgrade once case is off.
Globalyst 580 AT&T *Reader Service No. 774*	$3,185	No	Yes	Yes	★★½ Slow graphics and hard disk for this category.	★★★½ Cramped, obstructive design.	★★★½ Somewhat outdated components.	★★★ Good price, but slow and tough to service.
Poly 486-100 VP4 Polywell *Reader Service No. 775*	$1,995	No	Yes	Yes	★★½ May cause drowsiness in Windows.	★★★½ Puzzling case removal and a cabling nightmare.	★★★½ 100MHz 486DX4, Sound Blaster Pro, Diamond video.	★★★ Great price but slow performance.
PowerMate VP75 NEC *Reader Service No. 776*	$2,469	Yes	No	No	★★★ Fast CPU and disk performance, but mediocre application performance.	★★★★ Case design allows easy card and SIMM installation.	★★★½ Quad-speed CD, NEC monitor, but weak graphics.	★★★ Design simplifies upgrades, but performance lags.
Deskpro XE 4100 Compaq *Reader Service No. 777*	$2,868	No	No	Yes	★ Without Windows for Workgroups, this 100MHz crawls.	★★★★ Tough cover removal, but online help a hit with testers.	★★½ No local bus, no 32-bit access, but Qvision graphics.	★★½ Performance holds this system back.

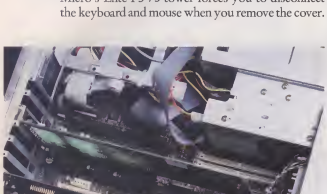
Usability Notes: Midrange PCs

We don't want to alarm you, but your PC's pretty exterior may be hiding a host of unusable features. For example, you may find that your SIMMs are hidden under the hard drive, or that you have no slots available for upgrading. To evaluate usability of midrange desktop systems, we signed up a group of *PC Computing* readers experienced with the ins and outs of upgrading.

As you get into higher performance systems like 75MHz Pentiums, you'd expect lots of room to grow. But size alone won't guarantee easy upgrades. For example, Insight's PCI P75 MM delivers a huge case but hides the SIMMs behind the drive bays. MidWest Micro's Elite P5-75 tower forces you to disconnect the keyboard and mouse when you remove the cover.

Acer's AcerAcros Pentium 75, on the other hand, has a small case, but is easy to work on. With Gateway's P5-75 Family PC, bigger was better: Once inside, testers found plenty of room to install new SIMMs and add expansion cards. The Pantera 75 from Zeos drew similar raves.

Regardless of the system, testers referred to documentation before forging ahead. And while most of the manuals were disappointing, there was a bright spot: CompuAdd's manual was jam-packed with clear diagrams of the entire system. Every connector, jumper, and cable is accurately illustrated. Combine that with the CP75p's easy-to-remove cover and accessible SIMMs, and you have great usability. **ADAM MEYERSON**



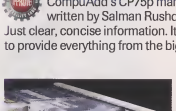
Seats Four Comfortably: No, you're not looking at a midsize sedan. This is Gateway's tower case—big and roomy. If you're looking for expansion, the P5-75 Family PC has more slots, drive bays, ports, and space to work in than any other system in this category.

Manual Transmission: With all the attention CompuAdd's CP75p manual got, you'd think it was written by Salman Rushdie. There's no action here. Just clear, concise information. It uses outstanding diagrams to provide everything from the big picture to minute details.

Usability Seal of Approval

Roomy system cases are nice for upgrading—but not if memory banks are out of reach under the hard drive. After close inspection, just eight of the fourteen systems we tested garnered our Usability Seal of Approval thanks to their smart case designs and excellent documentation.

- **AcerAcros Pentium 75** Acer
- **Celebris 575** Digital Equipment Corp.
- **CP75p** CompuAdd
- **Deskpro XE 4100** Compaq
- **Dimension XPS P75** Dell
- **P5-75 Family PC** Gateway 2000
- **Pantera 75** Zeos Int'l
- **PowerMate VP75** NEC



Upgrade Out of Reach: Make sure you get a repair technician with small hands to work on AT&T's Globalyst 580. Inside you'll find it's cramped and cluttered with a jumble of intrusive cables. Even when the cables are out of the way, the SIMMs are tough to reach and difficult to upgrade.

Bigger Isn't Always Better: Don't let its size fool you: MidWest Micro's Elite P5-75 is big, but the space is largely wasted. Two slots are lost to the serial and parallel ports, and there's a tangle of cables that you must painstakingly detach to reach underlying components.

You can send a fax like this.

1. Click on File Menu.
2. Click on Print Command.
3. Click on Printer Button.
4. Double-Click on Fax.
5. Click on Close.
6. Click on OK.
7. Type Name.
8. Click on Number Field.
9. Type Phone Number.
10. Click on Cover Page.
11. Type Cover Page.
12. Click on Send.

Or like this.

There's an easy way to do things and there's a hard way.

Thinking Mouse™ and Expert Mouse® from Kensington are the easy way.

For example, take sending a fax from your fax modem.

The hard way is to click here, double-click there, type in this, type in that, click once more.

You know the routine.

The easy way is to click once and bring up your own personalized pop-up menu. Click again and your fax is sent.

Thinking Mouse and Expert Mouse make life easier by letting you organize multi-step commands into time-saving pop-up menus.

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Circle 178 on reader service card.

Entry-Level PCs: High Return

Executive Summary

Numbers don't lie. Micro Express's MicroFlex PCI 66G not only trounced competitors in our application performance tests, but ranked in the top three for video performance tests, and had one of the highest raw CPU scores. Another number we liked: the $1,499 price. DEC's Venturis FP466 and Gateway's P4D-66 drew plaudits for their shrewd designs, which squeeze maximum performance from modest 66MHz 486 CPUs. Low overhead, high return; who could ask for more?

In the past, users who needed PCs primarily for essential productivity applications like e-mail and word processing often found themselves with slow, stripped-down machines. They were cheap, of course, but users soon saw any savings that may have been realized erode as they ran into performance bottlenecks. Not any more. Choose wisely and you can get a low-cost productivity powerhouse that repays your investment many times over.

All of the systems we tested included speedy 66MHz 486 CPUs (the bulk used Intel processors, but a handful sported chips from Cyrix and Advanced Micro Devices) and 8MB of RAM. While we generally recommend a minimum of 500MB storage, we accepted systems with smaller hard drives for testing, including systems that would otherwise be priced out of consideration.

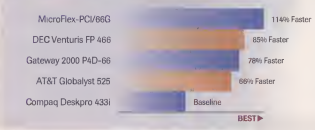
Highlights The results were indisputable—Micro Express's MicroFlex PCI 66G machine not only blew its competition off the test bench in our Winstone 95 application performance test, it also chalked up high scores in the video subsystem performance test, and more important, in our usability tests. Digital Equipment Corp.'s Venturis FP 466 and Gateway 2000's P4D-66 placed second and third, respectively, largely on the strength of their smart configurations. Both feature integrated 64-bit S3 chips and Windows for Workgroups 3.11 with its performance-boosting 32-bit file and disk access enabled.

Flex Muscle: Micro Express's MicroFlex-PCI/66G machine was a top performer, especially in our Winstone 95 tests.

Lowlights While most of the systems received high scores in our usability tests—Packard Bell's Legend 23CD, for example, wowed testers with its crowd-pleasing online user's guide. On the other hand, testers had to struggle to remove the case on Compaq's ProLinea 4/66, and once inside, found cables snaking across the system board. And SIMM sockets were blocked by the hard drive, making it necessary to remove components before the machine could be worked on. Similarly, testers couldn't properly install SIMMs or add-on boards in CompuAdd's machine, thanks to ill-fitting sockets and slots.

If you rate more-familiar brand names over price, then you can't go wrong with DEC's Venturis FP 466—which was second only to the MicroFlex in overall Windows application performance, while earning the best video and CPU scores of the pack. Or get Gateway's P4D-66, which sports a zippy hard drive and an easy-to-service case. Still, for the best of both worlds, nothing beats the price or performance of Micro Express's MicroFlex. SHYAMALA REDDY

Performance: Windows Apps



NOTE: WINSTONE 95 IS A BENCHMARK THAT RUNS 13 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

Rating Entry-Level Systems

Product	Price	Hard Drive > 350MB?	CD-ROM Drive?	External Cache?	Performance	Usability	Technology	Verdict
MicroFlex-PCI/66G Micro Express *Reader Service No. 778*	$1,499	Yes	Yes	Yes	★★★★★ Top Windows marks and snappy graphics.	★★★★½ Easy access, good layout.	★★★★ PCI local bus, ATI Mach64 card.	★★★★★ Great speed, no hassles, hot price.
P4D-66 Gateway 2000 *Reader Service No. 779*	$1,849	Yes	Yes	Yes	★★★★½ Great Windows score; fastest hard disk.	★★★★ Too many screws, but has a roomy case.	★★★★½ PCI local bus, Enhanced IDE, quad-speed CD-ROM drive.	★★★★½ Speed to spare, great price.
Venturis FP 466 Digital Equipment Corp. *Reader Service No. 780*	$2,548	No	Yes	Yes	★★★★★ Great Windows marks with top graphics and high disk scores.	★★★★ Solid case, accessible SIMMs.	★★★★ PCI local bus, 256K cache.	★★★★½ Fast but pricey.
Dimension 466 DM Dell *Reader Service No. 781*	$1,418	Yes	Yes	Yes	★★★½ Average Windows and graphics scores.	★★★★ Good documentation, obstructed SIMM sockets.	★★★½ Sound Blaster card, quad-speed CD-RDM.	★★★★ Could use a speed boost.
Genesis 466 Austin *Reader Service No. 782*	$1,539	Yes	Yes	Yes	★★★½ Average Windows performer.	★★★★ No tools needed, and good documentation.	★★★★½ PCI slots, integrated sound, quad-speed CD-RDM.	★★★★ Average performer, easy to service.
Q486DX2/66PM Quantex *Reader Service No. 783*	$1,699	Yes	Yes	Yes	★★★★ Good Windows scores and fast hard disk.	★★★½ Too many screws, weak documentation, obstructive layout.	★★★★ Three PCI slots, integrated sound.	★★★★ Good value for Windows users.
AcerAcros 4694 Acer *Reader Service No. 784*	$1,799	Yes	Yes	Yes	★★★ Slow Windows marks, low graphics and disk performance.	★★★½ Cramped case, obstructive layout.	★★★½ No local bus, integrated sound, quad-speed CD-RDM.	★★★½ Look elsewhere to run Windows.
Bravo LC 4/66d AST *Reader Service No. 785*	$1,500	Yes	Yes	Yes	★★★½ Sluggish with Windows.	★★★★ Roomy case, autoconfig BIDS.	★★★½ VESA local bus, dual-speed CD-ROM.	★★★½ Great price, but sluggish in Windows.
Globalyst 525 AT&T *Reader Service No. 786*	$2,319	No	Yes	Yes	★★★★ CPU and graphics leader; slow disk, problematic BIDS.	★★★★ Helpful documentation, safety power switch.	★★★½ VESA slots, 256K cache.	★★★½ Decent performance—at a price.
Personal Computer 350 IBM *Reader Service No. 787*	$2,799	No	Yes	Yes	★★★★ Strong Windows performer.	★★★★ No tools needed, great diagrams.	★★★★ VESA slots, Enhanced IDE, IBM Rapid Resume.	★★★½ Fast, but expensive.
C466D CompuAdd *Reader Service No. 788*	$1,795	Yes	Yes	Yes	★★★ Sluggish with Windows.	★★★ Lack of documentation makes upgrades tough.	★★★★ PCI slots, quad-speed CD-RDM. Poor case layout.	★★★ Good value, short on speed.
Express XV 4/66d ALR *Reader Service No. 789*	$1,995	No	Yes	Yes	★★★½ Sluggish with Windows.	★★★★ Roomy case, great autoconfig BIOS.	★★★½ VESA slots, Enhanced IDE, integrated sound.	★★★ Slow, but some nice extras.
Legend 23CD Packard Bell *Reader Service No. 790*	$1,600	Yes	Yes	No	★★½ Forget running Windows, and graphics run in slow motion.	★★★★½ Helpful documentation, autoconfig BIOS, online user's guide.	★★★½ No local bus, integrated sound, dual-speed CD-RDM.	★★½ Performance is less than a 33MHz 486.
ProLinea 4/66 Compaq *Reader Service No. 791*	$1,678	Yes	Yes	Yes	★★★ Slowwwww. All subsystems drag.	★★★½ Hard to open the case, obstructive layout.	★★★½ No local bus, but has a dual-speed CD-RDM.	★★½ DOS, anyone?

Usability Notes: Bargain PCs

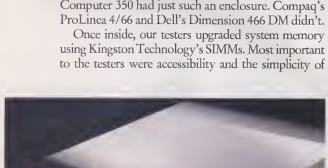
Getting the cover off a PC can be a real challenge. Getting it back on can be worse. For many desktop systems, unfortunately, usability ends once you get inside.

To test how easy entry-level systems are to service and upgrade we invited a group of our readers—all comfortable working inside PCs—into our Usability Labs to open systems, add RAM, and install a network card.

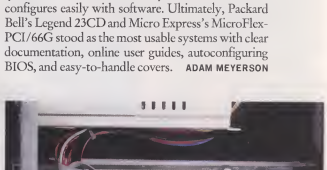
Our most obvious finding? Cases that used no screws or tools ranked the highest. IBM's Personal Computer 350 had just such an enclosure. Compaq's ProLinea 4/66 and Dell's Dimension 466 DM didn't.

Once inside, our testers upgraded system memory using Kingston Technology's SIMMs. Most important to the testers were accessibility and the simplicity of installing the SIMMs. In the AST, Digital Equipment Corp., Micro Express, and Packard Bell machines, the SIMM sockets were easy to find and the SIMMs snapped in place easily. Those from Compaq, CompuAdd, and Quantex sent testers on a treasure hunt by hiding the SIMMs behind or under other components.

Next, users installed an Intel EtherExpress network card. This was a simple task on all the systems, largely because the cover was already off and the Intel card configures easily with software. Ultimately, Packard Bell's Legend 23CD and Micro Express's MicroFlex-PCI/66G stood as the most usable systems with clear documentation, online user guides, autoconfiguring BIOS, and easy-to-handle covers. ADAM MEYERSON



Legendary: Kudos to Packard Bell's Legend 23CD in the entry-level systems category. Our testers got the cover on and off easily and declared that adding SIMMs was a breeze. The online user's guide, clear manuals, and autoconfiguring BIOS were top notch.



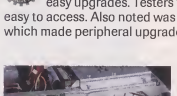
Room with a View: Micro Express's MicroFlex-PCI/66G is a roomy machine, which makes for easy upgrades. Testers found the SIMM sockets easy to access. Also noted was the overall system layout, which made peripheral upgrades a breeze.

Usability Seal of Approval

Adding memory or a second hard drive to a system doesn't have to be a chore. Ten of the systems we tested made adding *any* new component a breeze.

- **Bravo LC 4/66d** AST
- **Dimension 466 DM** Dell
- **Express XV 4/66d** ALR
- **Genesis 466** Austin
- **Globalyst 525** AT&T
- **Legend 23CD** Packard Bell
- **MicroFlex-PCI/66G** Micro Express
- **P4D-66** Gateway 2000
- **Personal Computer 350** IBM
- **Venturis FP 466** Digital Equipment Corp.

Hidden SIMMs: After careful inspection you'll notice Compaq's ProLinea 4/66 SIMMs are hidden under the hard drive, which must be removed to add RAM. It's not as hard as it sounds, but why the extra steps? Another obstacle is the web of cables blocking easy access.



Limited Options: Upgrade options are restricted in CompuAdd's C466D, thanks to only three available slots. Several testers failed to upgrade the SIMMs and couldn't get the network card installed. They also commented that the lack of documentation was a problem.

IT'S NOT IF. IT'S WHEN.

486, Pentium, PowerMac...

No matter how fast your PC is, it can't outrun a power problem

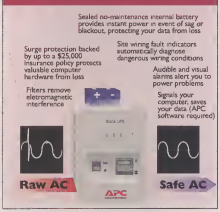
(Get Uninterruptible...starting at $119)

Just don't have the time for power problems on your PC? Don't worry. They'll always make the time for you. It's not if a power problem will occur, but when. Due to household appliances, poor wiring, bad weather or even other office equipment, power problems are as inevitable as death and taxes.

IN THE NEXT THREE MONTHS, MORE THAN 30,000,000 PCs WILL BE HIT BY POWER PROBLEMS...

In fact, you have better odds of winning the lottery than of escaping the sting of power problems on your PC. One study discovered a typical PC is hit over 100 times a month, causing keyboard lockups, hard drive damage, and worse. And since sags and blackouts represent more than 85% of power problems likely to hit your computer, standard surge suppressors are literally powerless to protect you. And a study in a recent *PCWeek* showed that the largest single

APC UNINTERRUPTIBLE POWER MEANS SAFE DATA, HAPPY COMPUTERS



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"This is the best computer related purchase I have ever made! Has saved me hours of re-programming..."
Carol Irvine, Wizard Assoc.

"We reduced our maintenance costs the first year by 50% in repairs of equipment."
Valentin Gonzalez, Pfizer

"Our server was running a project when it lost power... messed up all the data files. It took four days to recover. But we don't worry anymore since we got APC..."
Tony Chen, DeAnza Systems

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...le Corp.

...while ...! If not for ...ve had a
...SI Inc

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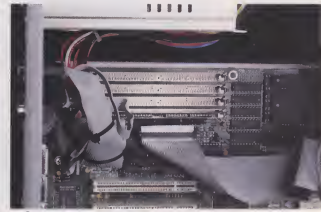

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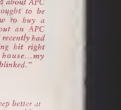

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Get a PC with Everything

Choosing a new PC is a complex balancing act. Sure, you can get everything you want, but you'll pay for it. As always, you have to weigh what you want against how much you're willing to spend. Before frustration sets in, make a list of what you need, prioritize it, then decide how much you're willing to pay. You will probably be pleasantly surprised to learn that you can generally have everything you want for less than $4,000. Here are the questions we ask when purchasing new systems:

How much are you willing to spend? Question *numero uno.* You may think the answer's set in stone: Just see what you allocated for new capital equipment last year when you were doing your budget. But that is just a starting point. Consider breaking into your piggy bank for a little more—prices right now can make spending a bit extra a good long-term investment opportunity.

What's the most important component? If you spend any serious time in Windows, you'll find that a 17-inch monitor is a must (see "Upgrades that Pay," page 196, November 1994). On the other hand, if you're performing database queries from a CD, you'll probably want a quad-speed CD-ROM drive. And if you install more than a few applications, you'll need a big hard disk. These compounded "ifs" could give an Excedrin tablet a headache. Start by planning to buy a 17-inch monitor, dual-speed CD-ROM drive, and at least 540MB of disk. The latter two are now standard equipment in most PC bundles, and the value of upgrading to a 17-inch monitor is unbelievably high.

How fast must your system be? If it takes Lotus 1-2-3 ten seconds to recalculate your spreadsheet instead of five, is it too slow? Figuring necessary performance can be the toughest question. Not only must you consider the applications you run today, but the business applications that lurk just over the horizon will demand as much power as your PC can deliver. The key is to determine when a slow system crosses the border from annoying to productivity-hindering.

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	Price	Usability	Tagram Thunderbolt
		Technology	Tagram Thunderbolt
Usability	Performance	Price	Tagram Thunderbolt
		Technology	CompuAdd CP75p
	Price	Performance	Gateway P5-75 Family PC
		Technology	Micro Express MicroFlex
Price	Performance	Usability	Gateway P5-75 Family PC
		Technology	Gateway P5-75 Family PC
	Usability	Performance	Gateway P4D-66
		Technology	Micro Express MicroFlex

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how

machine

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until infused with
ideas,
thoughts,
notions,
that come to it
through a keyboard.

we

TALK

to

the

To work faster,
to work seamlessly with
the machine,
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that instinctively slows the cursor
when near an icon,
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you have extensions of the machine,
of the software,
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That connect you
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WHERE DO YOU WANT TO GO TODAY?

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Printers: Output Options

You may not be cranking out Gutenberg bibles, but your documents—whether they're your company's internal newsletters, the latest sales projections, or high-quality presentations—can still get read religiously. Luckily, the hardest thing about creating effective, eye-catching output these days is choosing the technology that's right for you and your wallet: Should you get a perennial safe bet like Hewlett-Packard's LaserJet 4, or is a flashy dye-sublimation printer like Fargo Electronics' Pictura 310 more your speed? Whatever you need in a printer, you're sure to find it among the 26 machines we tested.

Monochrome printing is still the option of the masses. From speedy, high-resolution lasers to low-cost ink jets, there's something for everyone in the current crop of black-and-white printers. While the category winner boasts high-speed and high-quality output, you should also consider the usability extras we saw on some of the other models, including friendly configuration software and onscreen status reports.

If you're looking for snazzy color output on a shoestring, then consider the collection of budget color printers we tested. True, they're underpowered compared to their monochrome cousins, and a few bombed in our usability tests—but that's the price you pay for great-looking documents that won't break your bank. With this range of resolutions, output quality, and price, you may never work in black-and-white again.

For no-compromise, cost-is-not-an-issue color printing you have a variety of technologies to choose from: phase-change, thermal wax-transfer, dye-sublimation, and one technology that combines the latter two. With prices starting around $4,000, these printers are not for the casual color enthusiast—the investment required in terms of time and money means you'll want to reserve these printers for ad proofs and high-powered presentations, not your routine business documents.

While many printers were easy to set up and maintain, we found some usability no-no's: Digital's DEC-colorwriter 120ic forced us to flip dip switches to change the default configuration, while Mannesmann Tally's T9008 Laser Printer failed to document its tricky driver installation. Especially in high-volume shops, time spent on installation and service is as critical as the quality of the printed page.

SHYAMALA REDDY

Personal or Network: Lexmark's Optra R produces great-looking black-and-white pages at breakneck speed.

Why Buy Monochrome? Affordable color never looked as good as Tektronix's Phaser 140 color ink jet.

Pro Shop: Tektronix's Phaser 340 phase-change printer produces brilliant output, and it's easy to use.

What to Look For

Paper Flexibility If you're planning to print anything other than 8.5-by-11-inch pages, make sure your printer supports the sizes you need. Envelopes, legal-size pages, and so on should be de rigueur. Also make sure that your printer will support various bonds (thicknesses) of paper. A built-in multipurpose paper tray is the way to go.

Performance Your output speed will vary dramatically depending on the type of printer you choose. Ink-jet printers run around 3 ppm (slower for color); monochrome laser printers will start around 4 ppm, but you should expect to find a 6-ppm printer for a comparable cost. Color is slow: Faster printers can work at about 2 minutes per page; others keep you waiting 30 minutes or more.

Resolution When looking at laser printers, you'll want 300 dpi at a minimum, but the clearly superior 600-dpi printers can be had for just a little more. Ink-jet printers should sport at least 300-dpi resolutions. Most of the thermal wax-transfer, solid-ink, and dye-sublimation printers on the market have 300-dpi resolution.

Usability Any printer should work from your parallel port, but bidirectional parallel is becoming a must these days. That's the way to get maximum feedback. The printer's software should give you control over your document's output quality, down to the level of dithering. The more you can do from your desktop, the better, so front-panel controls are becoming outmoded.

Monochrome Printers

Executive Summary

You want it all in one printer? Speed, great output, and a low cost to boot? Lexmark's Optra R is powerful enough to keep a small network happy (if you buy the network option), and produces great-looking pages. But with a price tag of $1,749, you may not be able to afford to put one on every desktop. Offering a 12-ppm engine at 1,200 dpi, the Optra R churns out page after impressive page of top-notch output, and setup and maintenance are child's play.

Speedy Laser: If you're looking for high-speed text output, go with a fast engine, such as Lexmark's 12-ppm Optra R.

Basic black-and-white printers that won't break the bank aren't hard to come by these days—take a short walk and you'll probably find a 600-dpi laser printer that makes even the dullest documents look sharp. Of course when its costs so little to look good, it seems that everyone's doing it. Wanna stand out from the crowd? We've sized up the latest and greatest monochrome printers whose output will get you noticed.

We checked out a wide range of printers ranging from a fast, high-resolution (1,200 by 1,200 dpi) laser printer clear down to the cheapest ink jets the market has to offer (right around $350). Consequently we have many recommendations based on your budget and needs. Need top speed and resolution? Turn to Lexmark's 12-ppm, 1,200-dpi Optra R. For top-notch output, try Epson's 600-dpi ActionLaser 1400. Can't afford the frills of a laser printer? You'll be impressed by output from HP's DeskJet 540. It's not laser, but it's impressive nonetheless. In all, these three printers answer just about any black-and-white printing need you could come up with.

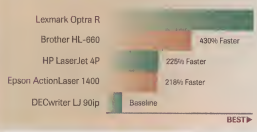
Highlights The laser printers most impressed us with performance, print quality, and usability. If you need speed, Lexmark's Optra R was made for you. With a 12-ppm engine, it blew the doors off the rest of them. Or are looks more your style? Epson's ActionLaser 1400 won the beauty contest hands-down with its spectacular output. If you don't mind a slower printer, you'll find a nice balance of features, usability, and high quality in Hewlett-Packard's LaserJet 4P—it's small, simple, stylish, and a snap to set up.

Lowlights Printing isn't always a bed of roses, however. Of the printers we evaluated, Digital Equipment Corp.'s DECwriter LJ 90ip takes the cake for the least technically advanced—this ink-jet printer calls for a manual priming ritual that we found tedious. To top it off, the performance was unpredictable at best, slow at worst. When it comes to setting up a printer, Mannesmann Tally's T9008 Laser Printer is not for the faint of heart—it's tricky driver installation isn't documented. Also, because of the poor documentation we made a spectacular mess installing the toner.

Laser output and high resolution (600-plus dpi) are cheaper than ever. Consequently, you can end your days of mediocre output with one purchase order. And even if you aren't ready to take the cost plunge to experience the virtues of laser printing, chances are you can satisfy your high standards.

KYLA K. CARLSON

Performance: Black-and-White Text



NOTE: BASED ON PRINTING AN 11-PAGE MICROSOFT WORD DOCUMENT.

Rating Monochrome Printers

Product	Price	Resolution	Paper Capacity	Measured ppm	Performance	Usability	Technology	Verdict
Optra R Lexmark Int'l *Reader Service No. 800*	$1,749	1,200 by 1,200	250	9.75	★★★★★ Speed and beauty in the same box.	★★★ Extendible paper tray is a snap to use.	★★★★ 1,200-dpi output? It doesn't get much better than this.	★★★★½ It's a real looker with great speed, even better output.
ActionLaser 1400 Epson	$849	600 by 600	100	3.38	★★★★ Highest-quality output at decent clip for its slower engine.	★★★ One cartridge says it all.	★★★½ Your basic laser with a 600-dpi twist.	★★★★ Looks? 10. Speed? Slower engine will keep you waiting.
LaserJet 4P Hewlett-Packard *Reader Service No. 801*	$1,229	600 by 600	250	3.46	★★★★ Output quality shines, despite a slow engine.	★★★ Easy rider. Slip in the toner and you're already printing.	★★★½ 600-dpi laser keeps your pages looking good.	★★★★ Not very fast, but excellent output quality for an ink jet.
Brother HL-660 Brother Int'l *Reader Service No. 802*	$1,088	600 by 600	200	5.64	★★★½ Dazzling output and impressive speeds.	★★★ All you do is feed it toner: The printer does the rest.	★★★½ Laser engine at 600 dpi—how can you miss?	★★★½ We'd all be lucky to have a little Brother.
DECLaser 5100 Digital Equipment Corp. *Reader Service No. 803*	$1,599	600 by 600	250	7.10	★★★½ High speeds and clear images.	★★★ Easy-to-use software is a plus.	★★★½ Stun them with your 600-dpi laser.	★★★½ Built for speed, plus the output looks good.
SuperScript 660 NEC *Reader Service No. 804*	$599	600 by 600	50	2.46	★★★½ A bit poky, but decent output.	★★★ Plug, print, and you're set.	★★★½ A 600-dpi laser engine, but low paper capacity.	★★★½ Your text documents will look great, even if you do have to wait for them.
TechJet Personal CalComp *Reader Service No. 805*	$699	360 by 300	100	1.61	★★½ Unspectacular output and speed for this class.	★★★★ A breeze to set up and even easier to maintain.	★★★ Ink-jet output with decent resolution.	★★★ Ease of use is the reason to buy the TechJet.
ProLaser 6000 Citizen America *Reader Service No. 806*	$849	300 by 300	150	5.77	★★★ Its print speeds mean business, but its output quality doesn't.	★★½ Not much RAM, and no software drivers whatsoever.	★★★½ Bare-bones 300-dpi laser engine.	★★★ This little guy is speedy, but the output quality doesn't measure up.
DeskJet 540 Hewlett-Packard *Reader Service No. 807*	$365	600 by 300	100	2.10	★★½ Mediocre monochrome speed.	★★★★ Easy maintenance, great software.	★★★½ Great ink-jet resolution; color upgrade kit a plus.	★★★ Slow, and its image quality is no match for laser.
Winwriter 600 Lexmark Int'l *Reader Service No. 808*	$1,199	600 by 600	200	6.29	★★★ Prints average-looking images at a decent clip.	★★★½ Onscreen status updates are a premium.	★★★½ 600-dpi laser, but output is only fair.	★★★ Knockout graphic speeds, but output quality doesn't stand up.
Okidata OL 410e Okidata *Reader Service No. 809*	$739	600 by 600	100	3.65	★★★ So-so speeds, and not-so-special output, relatively.	★★★ Two-part imager and toner is messy but functional.	★★★½ Bread-and-butter 600-dpi engine.	★★★ Average on all counts.
T9008 Laser Printer Mannesmann Tally *Reader Service No. 810*	$1,499	600 by 600	250	7.17	★★★ Good output at a good clip.	★★½ Drive installation not for the faint of heart.	★★★½ 600-dpi laser that can churn out the pages.	★★★ Great speed, fair output, tough installation.
DECwriter LJ 90ip Digital Equipment Corp. *Reader Service No. 811*	$340	300 by 300	15	1.06	★★½ A bit poky, and its output won't win any awards.	★★½ Printhead priming is a bit Neanderthal.	★★★ No-frills ink-jet printer.	★★½ Won't steal the thunder from any other printers here.

Budget Color Printers

Executive Summary

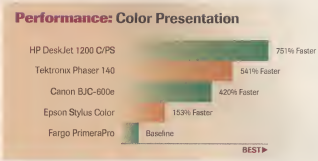
Say good-bye to the trade-offs you've come to expect from ink-jet printers. Just buy Tektronix's Phaser 140. Need speed? You got it. Great-looking output? Got that, too. Want to share the glory with your office mates across your network? No problem. In a nutshell, the Phaser 140 is an excellent all-around choice for an inexpensive color printer. With 360-by-360-dpi resolution, the quality is excellent. The $1,675 price is good, considering what you get.

You don't have a color printer yet? What are you waiting for? Oh sure, prices can always go lower, but the longer you wait, the longer your black-and-white documents are blending in with everyone else's, not turning heads, not getting you the recognition you deserve. You don't need to break the bank to buy color—all the printers we tested in this category rang in at under $2,000, and low-cost color printers, mostly ink jet, have come a long way.

Every low-cost color printer we tested, save one, is an ink-jet printer. The other? A dual-technology thermal wax-transfer and dye-sublimation printer—perfect for your color proofing needs. The printers we tested sport resolutions ranging from 300 dpi to 720 dpi, and the prices vary widely. Your output quality will depend on the resolution. Most of these low-cost models are bare-bones, no-frills printers: scarce on memory and processing power, but easy on the bankbook. But there are some lower-priced printers that will impress you, as well.

Highlights Not every ink-jet printer will fool you into thinking it's a $7,000 color laser. But a few might, particularly Epson's Stylus Color. With its 720-dpi resolution, this printer does more than turn a few heads. The downside? Slow printing speeds. Tektronix's Phaser 140 and Hewlett-Packard's DeskJet 1200 C/PS both churn out pages at a fairly rapid clip, offer networking options, and provide great output.

Quality and Speed: Tektronix's Phaser 140 turned in respectable times, even on the most complex documents.



NOTE: BASED ON PRINTING A 4-PAGE MICROSOFT POWERPOINT DOCUMENT

And Fargo Electronics' PrimeraPro really stands out from the rest with its dual-technology capability: The dye-sublimation output is so clean, you'll do a double-take on its low price tag.

Lowlights If only all low-cost printers could be so impressive. We did uncover some products that we don't think you should rush out to buy—Digital Equipment Corp.'s DECcolorwriter 120ic, for one. Although basic installation was straightforward, if you want to deviate from the default settings, you need to get under the hood and start flicking dip switches. If the output were spectacular we could live with that, but it isn't. Similarly, Lexmark's ExecJet IIC produced extremely washed-out images on plain paper.

Your excuses for putting off the purchase of a color printer are getting weaker. High-quality color is available at lower-than-ever prices. Sure, low-cost color printers aren't as fast as color lasers, but they'll save you several thousand dollars. And boy, will your documents look great!

KYLA K. CARLSON

Rating Budget Color Printers

Product	Price	Resolution	Paper Capacity	Measured ppm	Performance	Usability	Technology	Verdict
Phaser 140 Tektronix *Reader Service No. 812*	$1,675	360 by 360	100	1.36	★★★★⅕ Prints fast, output looks fantastic.	★★★★⅕ Great information when you have a problem and you need help—watch for the LCD to explain what's wrong.	★★★ This 360-dpi ink jet makes for stellar output.	★★★★½ Need speed? High quality? Ease of use? Buy this printer.
Stylus Color Epson America	$699	720 by 720	60	0.12	★★★★ It's not fast, but boy is the output gorgeous.	★★★ Easy to set up and maintain. Ink cartridges are secured by little covers that make replacement easy. But changing media options is annoying: You sometimes have to play around with the ink resolution.	★★★⅕ Highest-resolution ink jet in the bunch.	★★★★ Not the fastest, but certainly the best quality output we've seen in an ink jet.
DeskJet 1200 C/PS Hewlett-Packard *Reader Service No. 813*	$1,999	300 by 300	180	1.96	★★★★ The old standard holds its form: fast printing and great-looking output.	★★★★⅕ Super software does the tricky color work for you—there are even special instructions for users with color-impaired vision.	★★★ Run-of-the-mill 300-dpi ink jet.	★★★½ In a word? Fast. In two words? Solid printer.
PrimeraPro Fargo Electronics *Reader Service No. 814*	$1,895	600 by 300	50	0.10	★★★⅕ Great-looking output, but getting it can be tricky.	★★★ Status lights hard to see, but service is a snap—if you have (as is recommended) a lint-free cloth, alcohol, a small vacuum cleaner, *and* the PrimeraPro Head Cleaning Kit.	★★★⅕ It's the only low-cost dual-technology printer, but it's hindered by its own low-cost design.	★★★ Output looks almost as good as a Kodak snapshot—and takes about as long to process.
DeskJet 560C Hewlett-Packard *Reader Service No. 815*	$599	300 by 300	50	0.30	★★★½ Not a speed demon, but decent output.	★★★ Cleaning was tricky and the four manuals were overwhelming.	★★★ Its 300-dpi ink-jet technology is suitable for most situations.	★★★ Has the basics down pat—good-looking output but not really quick.
BJC-600e Canon Computer Systems *Reader Service No. 816*	$549	360 by 360	100	0.20	★★★ Good output, albeit somewhat washed out.	★★★ Setup is easy, but cleaning shouldn't be this difficult.	★★★ Ink jet with a 720-by-360-dpi resolution twist for black ink only.	★★★ A solid performer, though not outstanding in any one area.
ExecJet IIC Lexmark Int'l *Reader Service No. 817*	$379	300 by 300	150	1.04	★★★ Decent speeds, washed-out images.	★★★ Output tray feels chintzy, but status lights are a plus.	★★★ Ink-jet output at 300 dpi—no surprises.	★★★ Nice grayscale images, average speeds.
DEColorwriter 120ic Digital Equipment Corp. *Reader Service No. 818*	$355	300 by 300	70	0.41	★★⅕ Acceptable speed, but unacceptable color.	★★⅕ Its dip switches take us back to the Dark Ages.	★★★ 300-dpi ink jet, but too much manual intervention is required.	★★⅗ Decent speed, below-average output, and substandard setup and configuration technology.

High-End Color Printers

Executive Summary

Need an all-around color printer that's fast, reliable, and has good-looking output? We found it for you: Tektronix's Phaser 340 phase-change printer. While the output will never look as smooth as a continuous tone dye-sublimation printer, the Phaser 340's 300-by-600-dpi output produces superb colors. And if that isn't enough, the printer is a snap to set up and operate—just plop in the crayon-like wax sticks and you're off and printing.

When you decide you're willing to throw down a few extra bills for a higher-quality color printer, you're really forced to make some tough choices. Which technology? It depends on what you're printing. How much to spend? It depends on what you're printing. How fast? All together now: It depends on what you're printing. Are presentations your game? Look to thermal wax-transfer or solid-ink printers for good quality, low cost per page, and decent speeds. Text documents with a splash of color? Same issues, but check the clarity of text output before you buy. Photographic images? No doubt about it, a dye-sublimation printer is where you'll find the quality.

Our high-end color printers ran the gamut: thermal wax-transfer, phase-change (solid ink), and even a couple of dual-technology printers (dye-sublimation and thermal wax-transfer all in one box). Of course, one of the trickiest parts of buying a high-end color printer (besides parting with outrageously large sums of money), is figuring out which technology best suits your needs. It's really quite simple, as long as you're printing a consistent type of document.

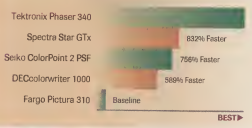
Presentations are one of the biggest uses for color printers—either printing out high-quality leave-behinds or breathtaking transparencies. Of the technologies we tested, thermal wax-transfer and dye-sublimation are best suited for the job. Both technologies require special paper, and dye-sublimation's cost per page may be reason enough to steer towards thermal wax-transfer. While you need special thermal wax-transfer paper, it's well under $1 per page. Thermal wax-transfer technology churns out at a rapid clip as well—rapid, that is, compared with other color technologies. And besides printing knockout presentations, a thermal wax-transfer printer does a fine job doubling as a text printer. We can't say the same about dye-sublimation. Solid ink also does well for presentations and text.

If you're printing photographic images or high-quality proofs, there's no doubt that dye-sublimation is the way to go. Yes, it's costly, but the continuous tone technology makes photographs look almost as good as they do when you pick them up from your one-hour development store. Your cost per page will easily be over $2, but it's cheaper than a service bureau if you need the technology.

Yet a third alternative is to go with a dual-technology printer—one that combines the lower cost and higher speed of thermal wax-transfer with the option of switching to dye-sublimation proofs. You won't

Color at a Clip: Tektronix's Phaser 340 was, incredibly, almost twice as fast as its closest competitor.

Performance: Color Presentation



NOTE: BASED ON PRINTING A 4-PAGE MICROSOFT POWERPOINT DOCUMENT

Rating High-End Color Printers

Product	Price	Resolution	Paper Capacity	Measured ppm	Performance	Usability	Technology	Verdict
Phaser 340 Tektronix *Reader Service No. 819*	$4,995	300 by 600	200	1.38	★★★★★ Prints fast, looks great.	★★★½ Up and running in 15 minutes–as a printer should be. It's also unique: You can reload its wax sticks as it runs.	★★★★ Phase-change solid ink. The only one of its kind.	★★★★½ Why can't every printer be this wonderful?
DECcolorwriter 1000 Digital Equipment Corp. *Reader Service No. 820*	$3,999	300 by 600	100	0.60	★★★★ Decent speeds, and the color's not too shabby, either.	★★½ Setup is this printer's weakest point. It also lacks front-panel controls.	★★★½ Thermal wax-transfer–great if your printing volumes are high.	★★★½ All-around good performance.
Spectra Star GTx General Parametrics *Reader Service No. 821*	$3,995	300 by 600	100	0.81	★★★½ Darker output makes for nice presentations. Average speed.	★★★ No surprises, and no harder than rest of 'em. We had to modify some configuration files manually during installation.	★★★½ This baby will jazz up even the dullest presentation.	★★★ Good speeds, but output can look a little grainy.
ColorPoint 2 PSF Seiko *Reader Service No. 822*	$4,999	300 by 300	100	0.74	★★★ Decent speed, but often so-so output.	★★½ It's tricky to get the image to appear on the page the way you want it. Includes an easy-to-use head cleaner.	★★★½ Thermal-wax and dye-sublimation in one box, but it could be done better.	★★★ Needs lots of attention to print the way you want it, but has good speeds and colors.
Pictura 310 Fargo Electronics *Reader Service No. 823*	$4,995	300 by 300	135 (B-size)	0.09	★★★ Great-looking output–if you have a while to wait for it.	★★½ Poor panel indicators, and requires a RAM- and disk-packed system.	★★★★ A well-done dual-technology printer.	★★★ If you can afford to wait, and if you can interpret printer errors, this is a good deal.

find many of these printers out there (we were able to test only two), but they could be just the ticket if you're stuck in that technology dilemma.

You were expecting color laser printers? Not this time—the current crop of color lasers costs far too much for us to consider them a stand-alone desktop printer. With the rest of these printers, don't hold your breath waiting for output—they require a few extra minutes to produce your color documents in tip-top shape. Chances are you'll buy one of these printers when color really matters to your business, for example, when you need to create sales presentations, photographic or advertising proofs, or proposals that stand out from the competition.

Highlights One printer, Tektronix's Phaser 340, not only produced great-looking documents, but it also printed circles around its competitors. Digital Equipment Corp.'s DECcolorwriter 1000, while not quite as snappy, did produce high-quality output. And naturally, the dye-sublimation output of Fargo Electronics' Pictura 310 really wowed us—but it took some waiting for the output.

Lowlights If you can't afford to wait, you can't afford Fargo Electronics' Pictura 310. In addition to clocking the slowest printing speeds, the Pictura 310 has some host system requirements that will make you shiver—including a whopping 32MB of RAM and a minimum of 80MB of free hard disk space. Although capable of producing excellent output, Seiko's ColorPoint 2 PSF tried our patience because we had a hard time getting the images where we wanted them to appear on the page.

Buying a color printer isn't just a matter of checking out the prices, speeds, and feeds. You need to evaluate the task at hand, and choose a technology accordingly. Once you have narrowed that down, you can delve into the details. It may sound tough, but who ever said that looking good was easy? KYLA K. CARLSON

Choose the Right Printer

Color or monochrome? Ink jet or something else? Fast or inexpensive? Decisions, decisions. Printers are so varied that you could spend a month just trying to figure out what type of technology you want. Don't bother. Instead, let these questions be your guide:

How much can you spend now—and later? With printers, it's not just a matter of how much you can afford at the time of purchase—there are consumables to think of, too. Paper, ink, toner, those rolls of wax—they add up. In the case of monochrome laser printers, they don't add up all that quickly: You'll most likely be printing on typical photocopier paper and using inexpensive toner. Figure a penny or two per page. If you need color, ink jet is the inexpensive way to go: It prints pretty well on plain paper (special stock looks better but costs more) and the ink cartridges are reasonable. Figure from five to 15 cents a page. At the other end of the scale, dye-sublimation printing can run a couple of dollars per page. Which leads to the next question.

What level of quality do you need? After all, printing out your e-mail is a bit different from printing a proof of your annual report. These days, 300 by 300 dpi is a pretty standard starting resolution—one that generates clear hard copy. Better printers output 600 by 600 dpi or better. Can you tell the difference? Yes, especially when a document is reproduced. There's an almost perfect correlation between a printer's output resolution and its standing in our jury tests: Higher is better. So you should get the best resolution you can.

How fast does it need it to be? Sometimes speed isn't an issue—for example, if you print only one page a day. Most of us print a few pages a day and can tolerate a little waiting. But with some printers, especially high-quality color printers, you're going to have to tolerate a lot—think in terms of minutes per page, not pages per minute. And if you're planning on sharing your printer on a network, speed becomes a serious issue.

DECISION MAKER

CHOOSE A **PRINTER** THAT SUITS YOUR BUSINESS NEEDS

1 Choose the factor most important to you.	2 Choose the type of output you want.	3 What else is important?	4 For your needs, the best product to buy is . . .
Performance	Color	Price	Epson Stylus Color
		Usability	HP DeskJet 1200 C/PS
	Monochrome	Price	Epson ActionLaser 1400
		Usability	Lexmark Optra R
Usability	Color	Price	Tektronix Phaser 140
		Performance	Tektronix Phaser 140
	Monochrome	Price	HP DeskJet 540
		Performance	HP DeskJet 540
Price	Color	Usability	HP DeskJet 560C
		Performance	Lexmark ExecJet IIC
	Monochrome	Usability	HP DeskJet 540
		Performance	HP DeskJet 540

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3M *Reliability*

Peripherals: Key Add-Ons

You just bought the fastest Pentium system there is, but if you saddle it with an old 2,400-bps modem, your downloads will still crawl. Don't let your peripherals be the bottleneck that drags down your system. We tested the best in peripherals—quad-speed CD-ROM drives, 24-bit color scanners, 16-bit sound cards, and 28.8Kbps modems—so you can select the add-ons best-suited to your system, budget, and business.

We chose to evaluate only quad-speed CD-ROM drives. At press time, the prices on these drives huddled around $500, but that's about to change. We've already seen Plextor's 6Plex—a six-speed CD-ROM drive. Every indication is that as six-speed (and faster) drives enter the market, prices of quad-speed drives will drop to around $200, which will soon make dual-speed CD-ROM drives obsolete, just as dual-speed drives drove single-speed drives into the background.

When it came to scanners, we also chose to take the high end, looking only at 24-bit and higher models. Prices on these models start at just a few hundred dollars, which makes them irresistible and narrows the market for scanners with lower-bit depths. All the scanners we tested can serve multiple purposes—from scanning full-color photographs to acting like a 2-bit, black-and-white scanner so you can input documents for OCR.

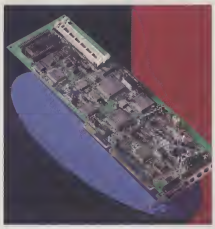
Subject a group of audiophiles to 8-bit sound cards and they'll run screaming after just a few seconds. The sound quality is, shall we say, rough. The days of the 8-bit sound card have long been over, and 16-bit sound cards are the standard. We chose to evaluate 16-bit sound cards with a 24-voice MIDI capability and wave-table synthesis—the current high end.

Right now, you can purchase a 28.8Kbps modem for less than $200. That does to 14.4Kbps modems pretty much what 14.4Kbps modems did to 9,600-bps modems—redefine the standard. So we evaluated 28.8Kbps modems only. The performance and features turned out to be remarkable values. At the high end of the price scale you can spend nearly $900, but high quality can be had for much less.

Top-notch peripherals can increase the power of a new PC or add new life to your aging one. When purchasing peripherals, don't skimp—like all other components, they make a difference. JOHN MONTGOMERY

On the Quad: Quad-speed CD-ROM drives like those from Toshiba (top) and Plextor are the new standard.

Colorful Language: Hewlett-Packard's ScanJet 3c color scanner proved to be formidable in our tests.



Have a Blast: Creative Labs' Sound Blaster AWE32 has a great combination of quality and features.

Modern Modem: Motorola's V.3400 modem offers great performance for all kinds of connections.

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Circle 184 on reader service card.

Quad-Speed CD-ROM Drives

Executive Summary

In a close race, Plextor's 4Plex 256 and Toshiba's XM-3501E came in neck and neck. Their much faster access times coupled with good overall performance, ease of use, and installation edged them ahead of the other drives. Both of these drives ship complete with good-quality SCSI cards (Adaptec or Future Domain for Plextor and Future Domain for Toshiba) and feature one-step setup software that will have you up and running in minutes.

The question isn't "Do I need a CD-ROM drive?" It's "How fast a CD-ROM drive do I need?" The 300KBps performance of dual-speed drives that looked so impressive just two years ago is outclassed by today's quad-speed drives. So with an eye toward finding a drive you'll still be happy with a couple of years from now, we evaluated four quad-speed models.

Our tests proved that each drive can deliver data at near–hard-drive 600KBps transfer rates—comfortable enough to deliver desktop video or applications. Setting up drives with their own SCSI controllers and software proved to be easier than it once was. And each drive is equipped to play audio CDs while you're not working with CD-ROMs. The real differentiation we found was in access times, which is most important for data search. Here Toshiba's XM-3501E and Plextor's 4Plex 256 stood out.

Highlights You know you do it. Everyone does it. We all listen to audio CDs on our drives while we work on projects that don't require CD-ROMs. Yet of the drives we evaluated, only NEC's MultiSpin 4Xe provides separate audio controls on the front of the drive for that extra usability touch. But that's not the only benefit we appreciated. Pioneer's DRM-604X six-pack cartridge provides the capability to load multiple CD-ROMs—each one automatically mapped to its own drive letter. Sure it takes a couple of seconds to mount a new disc (there's only one drive mechanism), but that's faster than loading one into a caddy and swapping discs on a single-disc drive.

Close Match: Toshiba's XM-3501E (top) and Plextor's 4Plex 256 won top honors thanks to rapid access times.

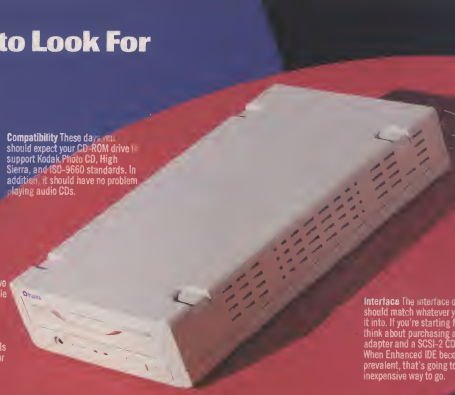
Lowlights Running counterintuitively to every other CD-based device, Pioneer's DRM-604X makes you load discs into the magazine with the label facing *down*. This will fool everyone the first time they set up the drive, and most likely every time they slap in a new CD. The MultiSpin 4Xe's LCD status panel seems like a good idea—it shows disc status and drive speed—but it loses helpfulness because it's partially obscured by the lip that houses the drive slot, and it's not easy to read unless viewed straight on.

This crop of CD-ROM drives is tough to fault. They're all good performers, and the technological bar has been raised several notches in the past 12 months. Each of the drives reviewed here belts out the data. Certainly the generation of sextuple-speed CD-ROM drives is coming down the pike—spearheaded by Plextor's 6Plex—but the price and availability of quad-speed drives makes them the product for everyone to consider today.

BENJAMIN F. MILLER

NOTE: BASED ON MICROSOFT'S VIDEO FOR WINDOWS VIDTEST ACCESS-TIME TESTS

What to Look For



Compatibility These days, you should expect your CD-ROM drive to support Kodak Photo CD, High Sierra, and ISO-9660 standards. In addition, it should have no problem playing audio CDs.

Performance Tricks We looked for drives that could sustain data transfer rates of 600KBps. If you're purchasing a stand-alone CD-ROM drive, look for at least quad speed, with sextuple-speed (6x) drives coming out soon.

Usability For the ultimate in usability, look for a drive with two main features: a double door and front-panel controls. The double door hinders the entrance of dust, and the front-panel controls enable you to treat your CD-ROM drive like an audio CD player.

Interface The interface on the drive should match whatever you're plugging it into. If you're starting from scratch, think about purchasing a SCSI-2 host adapter and a SCSI-2 CD-ROM drive. When Enhanced IDE becomes more prevalent, that's going to be an inexpensive way to go.

Rating Quad-Speed CD-ROM Drives

Product	Price	Separate Audio Ports	User-Caddy	SCSI Card	Performance	Usability	Technology	Verdict
Plextor 4Plex 256 Plextor *Reader Service No. 831*	$459 to $519	Yes	Yes	Yes	★★★★ Top of the class—right next to Toshiba's XM-3501E. Very impressive access times, at least in part due to the 256K buffer.	★★★★ Quick and easy installation. Uses a CD caddy.	★★★★ 256K buffer, stereo audio output, but no audio controls.	★★★★ A good all-around performer.
Toshiba XM-3501E Toshiba *Reader Service No. 832*	$545	Yes	Yes	Yes	★★★★ Top of the class—right next to Plextor's 4Plex 256. Very impressive access times, thanks in part to the 256K buffer.	★★★★ You'll be up and running, and out of the gate in less than ten minutes. Like the others, it uses a CD caddy. This is either a pro or a con, depending on your preference.	★★★★ Matches Plextor's drive, feature for feature.	★★★★ A good all-around performer.
MultiSpin 4Xe NEC *Reader Service No. 833*	$695	Yes	Yes	Yes	★★★ Excellent throughput, but lags on access tests.	★★★½ A handy LCD status panel is marred by being hard to read. Uses a CD caddy.	★★★½ 128K buffer doesn't hamper throughput.	★★★½ Top-of-the-range audio CD controls.
Pioneer DRM-604X Pioneer *Reader Service No. 834*	$895	Yes	No	Yes	★★★ Fast throughput, faster disc swapping than you'll manage by hand. Slower access times than the other drives in this category, however.	★★★ Load the CD-ROMs upside down? That's strange. Uses a CD cartridge.	★★★★ Six-disc loader, single reading mechanism. Lights indicate audio or data mode. The 128K buffer doesn't hamper throughput.	★★★½ You want this one if you need access to multiple CDs.

24-Bit Color Scanners

Executive Summary

For color and grayscale scans, Hewlett-Packard's ScanJet 3c tops the bill. We found it easy to use and fast in its preview scan mode. Although its high-quality scanning mode is slower than most of the other scanners we tested, the scan quality more than compensates. Envisions' ENV6600S followed close behind with faster performance in high-quality mode and a knockout price—it was the lowest-priced scanner we evaluated for the review.

It seems we all want colorful pictures fast. How else can you explain why one-hour film developers, Polaroid instant film, and camcorders have caught on? The same is happening to color scanners as we realize that we can use them to brighten presentations, digitize photos, and help tame the paper tiger with optical character recognition (OCR).

The question then becomes, who provides the best, most colorful scans in the shortest time? The short answer is Hewlett-Packard's ScanJet 3c. But, as with many short answers, this one leaves out some of the subtleties in measuring scanner performance.

Most color scanners operate in two modes—a quick-and-dirty mode and a slow, high-quality mode. The consistent winner of the quick-and-dirty preview races is HP—which is truer than ever of its newest scanner, the 30-bits-scanned, best-24-delivered-to-your-PC ScanJet 3c. The ScanJet 3c also took top marks when we took unmarked color scans from all eight scanners we tested and did side-by-side jury testing.

But—and this is the crucial thing to understand—the jury-winning images were scanned at HP's quality mode, and in its quality mode the ScanJet 3c's performance trailed almost every other scanner. So, which scanner offers the best combination of speed and color fidelity? In our tests it was Envisions' ENV6600S. However, its handling of OCR was the most error-riddled, and its grayscale scans were muddy.

Quick Scan: Hewlett-Packard's ScanJet 3c beat the others by a wide margin in quick-and-dirty scanning mode.

Highlights According to our jury, Agfa's StudioScan II and Relisys's Reli 4830T did particularly well at scanning grayscales. And according to our OCR tests, scans made with Canon's IX-4015 had almost no errors—fewer than a third of the recognition errors of HP's ScanJet 3c. Finally, the software bundled with Canon's IX-4015—called Ofoto—is tops in usability (although the hardware leaves a bit to be desired).

Lowlights Although it's fast and usable, Canon's IX-4015 didn't fare well under the loupes of our jury testers. Its scans were near the bottom in both grayscale and color quality. Relisys's scanning software had some inexcusable flaws—including an incorrectly-scaled ruler and the lack of an autoscan feature.

In a category like general-purpose scanning—in which people have distinct and separate needs for color, grayscale, speed, and OCR clarity—the maxim "one size doesn't fit all" rings true. With that in mind, HP's ScanJet 3c, Envisions' ENV6600S, and Epson's ES-1200C Pro are all definitely admirable scanners. MATTHEW LAKE

Performance: High-Quality Scans

NOTE: BASED ON SCANNING A 4-BY-5-INCH, 300-DPI IMAGE IN 24-BIT COLOR

What to Look For

Image Type You can get by with 8-bit color (or monochrome) depths for OCR and the like, but you'll probably find that adding 24-bit color doesn't add much to the price tag and makes the scanner more useful.

Usability Software is the key to using a scanner. You should be able to configure the scanner to do whatever you want using bundled software, and the software should have a preview function so you don't waste time scanning something that isn't right.

Resolution Hardware resolution of 300 dpi or more causes problems and 600 dpi with few problems. Resolutions around 1,200 dpi are becoming more common, but they're still a bit expensive. When talking resolution, make sure it's actual resolution, not interpolated.

Interface Look for two things: SCSI-2 and TWAIN. A scanner will ideally come with its own SCSI-2 interface card and will plug into the more common ones with no problem. TWAIN compliance these days is a must.

Rating Color Scanners

Product	Price	Max. Resolution (dpi)	Interpolated Resolution (dpi)	Performance	Usability	Technology	Verdict
ScanJet 3c Hewlett-Packard *Reader Service No. 835*	$1,179	600 by 600	2,400 by 2,400	★★★★ No one comes close. Solid performance.	★★★★ Easy to calibrate, adjust, and scan.	★★★★ Patented trichromatic technology.	★★★★½ In a different league.
Envisions ENV6600S Envisions *Reader Service No. 836*	$529	300 by 600	1,200 by 1,200	★★★½ Good color image quality.	★★★½ Easy to install. Fairly easy to scan.	★★★ Low resolution is the limiting factor.	★★★½ Good performance, great price.
Epson ES-1200C Pro Epson	$1,299	600 by 600	2,400 by 2,400	★★★★ Good on grayscale, weaker on color.	★★★ A few software glitches, but has potential.	★★★½ Resolution is impressive.	★★★½ Good hardware, needs better software.
Vista-S6 LE Umax *Reader Service No. 837*	$799	300 by 600	1,200 by 1,200	★★½ Lackluster image, but good OCR.	★★★★ Very easy to install and scan.	★★★ Nothing really new here.	★★★ Ideal scanner for novices.
StudioScan II Agfa *Reader Service No. 838*	$859	400 by 800	2,400 by 2,400	★★★½ Has the hardware to do the job.	★★½ Getting good results requires a lot of effort.	★★★★ A well-built scanner.	★★½ Relatively poor usability drops this score.
Canon IX-4015 Canon *Reader Service No. 839*	$799	400 by 400	400 by 1,200	★★ Images can become overexposed very easily.	★★★½ Excellent software makes it easy to scan.	★★★½ 400-by-400-dpi provides reasonable definition.	★★½ Mediocre image quality compared to others.
Reli 4830T Relisys *Reader Service No. 840*	$1,999	1,600 by 400	4,800 by 4,800	★★★ Pretty good, but still relatively slow.	★½ Very clumsy software makes scanning difficult.	★★½ High stated resolution doesn't help image quality too much.	★★ Poor usability hampers this scanner severely.
ScanMaker IISP Microtek *Reader Service No. 841*	$575	300 by 600	1,200 by 1,200	★★★ Jury tests showed it to be pretty good.	★ Watch out: The software may bite.	★★★ Nothing really new here.	★★ Tough to tackle.

16-Bit Sound Cards

Executive Summary

With near-top quality sound, Creative Labs' Sound Blaster AWE32 comes with a lot of interesting and useful software—from a business-oriented text-to-speech module to the Cakewalk Apprentice music sequencer. It also features expandability in the form of software "sound fonts." Two other cards, Turtle Beach's Tropez and Orchid Technology's SoundWave 32Pro also earned high marks. The Tropez had the best sound quality and the SoundWave 32Pro has full SCSI support.

If you were actually satisfied with substandard sound, you'd never have migrated beyond that early-1970s mono boom box with the bus-terminal–quality speaker. And you'd probably also be content with PC audio that consists of beeps from your 50-cent internal speaker. But you're not, so if you're going to invest in PC audio, you might as well invest in the best.

So what makes a good sound? We ran all the lab tests you'd need—signal-to-noise ratio, stereo separation, frequency-response curve, and power output—and we factored the results into our analysis. But what it all boiled down to is this: How did a panel of audiophiles react when we played 16-bit, 44kHz, CD-ROM quality sounds through a mixing desk and excellent speakers? Here's how: Turtle Beach's Tropez sounded best to the ear and to the electronic analysis devices. Creative Labs' Sound Blaster AWE32 and Orchid Technology's SoundWave 32Pro both played very well—so close that it's hard to judge which sounded better. And coincidentally, they were all easy to install and configure.

Highlights The Sound Blaster AWE32 has a wide variety of high points: Its 32-voice polyphony and bundled Cakewalk Apprentice software provide the possibility of a rich MIDI experience. Its software-based "sound fonts" let you expand your repertoire of instrument samples at $29 a pop. And for applications that support it, its QSound playback makes for wide stereo sound. Media Vision's Pro-3D goes that wide stereo experience one better by providing sound retrieval system (SRS) support, which enhances any sound you play through the card. And the boards from Orchid and Logitech feature easy-to-configure SCSI interfaces for speedy CD-ROM hook-ups.

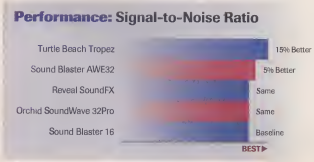
Loud and Clear: In terms of sheer value, Creative Labs' Sound Blaster AWE32 package is hard to beat.

Lowlights The SoundWave 32Pro's power amplifier produces a lot of distortion—which means that any speakers attached to the headphone-out socket won't provide faithful sound reproduction. And Aztech Labs' Sound Galaxy WaveRider 32+ suffered from two drawbacks: Its total harmonic distortion was too high, and it was extremely difficult to configure with other cards—such as SCSI cards from Adaptec that sat comfortably alongside all the other contenders.

If you're looking for absolute sound purity, the closest you'll find in this roundup is Turtle Beach's Tropez. But for overall value and perfectly acceptable performance in sound, go for Creative Labs' Sound Blaster AWE32.

MATTHEW LAKE

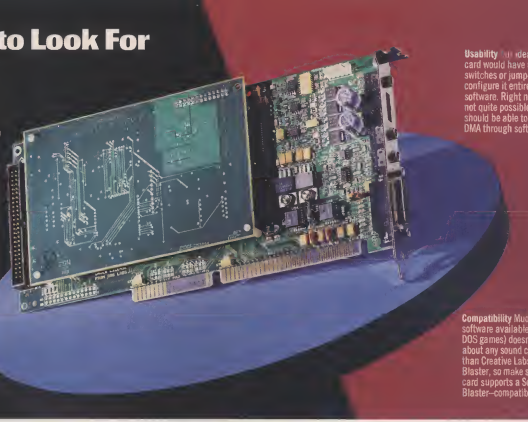
Performance: Signal-to-Noise Ratio



NOTE: MEASURES HOW "CLEAN" OUTPUT IS.

What to Look For

Sound Quality Sound cards come with a lot of numbers. Here are the key ones to watch for: 44.1kHz maximum sampling rate, 16-bit record-and-play options, 15 minimum simultaneous voices, and wave-table synthesis. We prefer cards that are stereo in both record and playback modes.



Usability An ideal sound card would have no dip switches or jumpers—you'd configure it entirely through software. Right now that's not quite possible, but you should be able to set IRQ and DMA through software.

Compatibility Much of the software available (especially DOS games) doesn't know about any sound card other than Creative Labs' Sound Blaster, so make sure your card supports a Sound Blaster–compatibility mode.

Rating Sound Cards

Product	Price	Signal-to-Noise Ratio (dB)	CD-ROM Interface	Jumperless Configuration	Performance	Usability	Technology	Verdict
Sound Blaster AWE32 Creative Labs *Reader Service No. 842*	$399.95	79	IDE	No	★★★★ Clean, strong output makes it good for all audio situations.	★★ No SCSI CD-ROM connections, which may make it difficult to upgrade.	★★★★★ Does wave-table synthesis well. Can easily upgrade sample size with standard SIMMs.	★★★★½ Nice sound, easy install, easy upgrade. Not best in everything, but best all around.
Tropez Turtle Beach *Reader Service No. 843*	$249	86	ATAPI	Yes	★★★★½ The one for the highest-quality sound.	★★★ Provides only an ATAPI connection for CO-ROM.	★★★★ Excellent wave-table implementation.	★★★★ Great-sounding, well-configured.
SoundWave 32Pro Orchid Technology *Reader Service No. 844*	$229	74	SCSI	No	★★★½ Good overall performance, but too much distortion on unpowered speakers.	★★★★ SCSI connections for easy CO-ROM upgrade. FM playback.	★★★★ Good, upgradable wave-table synthesis and	★★★★ Handy set of everything.
Pro 3-D Media Vision *Reader Service No. 845*	$379	68	SCSI	Yes	★★★ A bit too much distortion, but not enough to make it a bad choice.	★★★★ SCSI connections for easy CD-ROM upgrade.	★★★★ SRS 3-D imaging helps it sound great to the ear. Excellent use of wave-table synthesis.	★★★½ Nice set of features and sound options. Just a bit too distorted to be top-tier.
SoundFX Reveal Computer Products *Reader Service No. 846*	$149.99	74	IDE	Yes	★★★★ Did well in all of our performance tests.	★★★ No SCSI CO-ROM connections.	★★★ Good use of wave-table synthesis.	★★★½ Sounds fine, installs well.
SoundMan Wave Logitech *Reader Service No. 847*	$249	74	SCSI	No	★★½ Distortion a bit high—undesirable for higher-end audio.	★★★★ SCSI connections for easy CO-ROM upgrade.	★★★ Sufficient wave-table implementation.	★★★ Easy to configure and nicely packaged.
Sound Galaxy WaveRider 32+ Aztech Labs *Reader Service No. 848*	$159	73	IDE	No	★★ Too much distortion and a low signal-to-noise ratio.	★★ No SCSI CO-ROM connections.	★★★ Uses wave-table technology.	★★½ Tricky installation and high distortion.

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28.8Kbps Fax Modems

Executive Summary

Motorola's V.3400 beat ten of the best 28.8Kbps modems in a grueling battery of usability, performance, and compatibility tests, narrowly edging out Microcom's DeskPorte Fast and U.S. Robotics' Sportster V.34. It won our overall ranked performance test as well as our compatibility test, and it's a pleasure to use. The price is too high, but when it comes to 28.8Kbps modems, they simply don't get any better than Motorola's V.3400.

Solid Connection: When it comes to 28.8Kbps modem speed, nothing tops Motorola's V.3400.

No person—or computer—is an island. That's why no desktop or portable system is complete without a modem. And while you need to stay connected for communication, commerce, and culture, you also need to control costs. Enter 28.8Kbps modems, combining unbeatable high-speed performance and compatibility at outstanding prices.

The current crop of 28.8Kbps modems are essential tools for accessing a world of online services, as well as videoconferencing, remote computing, and more. We subjected eleven 28.8Kbps modems to grueling usability and performance tests. The results show that not all modems are created even remotely equal.

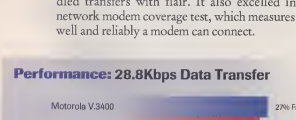
Three of the modems quickly rose to the top of our list, but none was better than Motorola's V.3400, the leader for versatility, compatibility, and speed. The V.3400 won our compatibility test, which measures the connection capability for modems commonly used with the three major online services. It also won our overall ranked performance test, which measures data transfer and integrity.

Highlights You can't always count on good line conditions—static, noise, and lost connections are usually the norm. However, under non-adverse conditions, Practical Peripherals' ProClass 288MT handled transfers with flair. It also excelled in our network modem coverage test, which measures how well and reliably a modem can connect.

Lowlights While still worthy of consideration, Boca's V.34 External BocaModem, Zoom Telephonics' Zoom FaxModem V.34X MacPack and Best Data Products' Smart One 2834 FX were up against stiff competition and turned in less-than-glorious performances. In overall ranked modem performance, they trailed at the back of this admittedly fast pack. Compatibility was also a problematic hurdle for the modems.

Connecting easily at a fast, reliable speed is of utmost importance for any modem. With this in mind, you can't go wrong with Motorola's V.3400, our favorite pick for almost everything. It can connect to any other kind of modem, and even in the worst line conditions it maintains very good performance. Our one concern with the V.3400 is its $895 price tag—very high. Close on its heels are Microcom's DeskPorte Fast and U.S. Robotics' Sportster V.34, both impressive performers. In addition, the DeskPorte Fast and the Sportster V.34, at several hundred dollars less than Motorola's V.3400, are outstanding bargains. **RICH SCHWERIN**

Performance: 28.8Kbps Data Transfer



NOTE: DATA PERFORMANCE SCORES ARE A COMPOSITE AVERAGE OF VARIOUS DATA TRANSFER TESTS

What to Look For

Performance You want a V.34 modem capable of signaling rates of 28.8Kbps for top performance—expect 115.2Kbps throughput when you tack on V.42bis compression.

Usability We love modems with an external LCD that lets you know what's going on in plain English. In addition, we look for modems that are compatible with other standards, especially because V.34 is still fairly new.

Fax and Voice These days, the modem that doesn't support fax is the oddball. In addition, more boards are supporting voice, enabling you to turn your PC into a kind of answering machine.

Rating 28.8Kbps Modems

Product	Price	Fax-ROM	LCD Screen	Fax Standard	Performance	Usability	Technology	Verdict
Motorola V.3400 Motorola *Reader Service No. 849*	$885	No	Yes	Class 1	★★★★★ Best all-around modem we tested.	★★★★½ All it's missing is a cable (and flash ROM).	★★★★ V.34 support, great compatibility, and reliability.	★★★★★ A versatile, fast, compatible modem.
DeskPorte Fast Microcom *Reader Service No. 850*	$425	Yes	Yes	Class 1	★★★★ Above average in all tests.	★★★★½ Does everything except plug itself in.	★★★★ V.34, V.FC, and MNP 10 support; and cellular capable.	★★★★½ Moves data quickly.
Sportster V.34 U.S. Robotics *Reader Service No. 851*	$339	No	No	Class 1	★★★★ High marks in compatibility and call connections.	★★★★½ Volume control on side; standard LEDs.	★★★★ V.34 and V.FC supported.	★★★★½ You won't be disappointed.
ProClass 288MT Practical Peripherals *Reader Service No. 852*	$325	No	No	Class 1 & 2	★★★★ Fastest raw transfer speed in the test.	★★★½ Hayes ESP2 optional; good software.	★★★½ V.34, V.FC, and caller ID support.	★★★★ Fast, but poor compatibility.
Comsphere 3800 Plus AT&T Paradyne *Reader Service No. 853*	$895	Yes	Yes	Class 1 & 2	★★★½ Reached 33.6Kbps.	★★★ LCD is a plus, but lacks software.	★★★½ Supports V.34, V.32 terbo, and V.34+.	★★★½ Pricey, but mostly average.
FaxModem 288 Supra *Reader Service No. 854*	$244.95 to $264.95	Yes	Yes	Class 1 & 2	★★★½ Slightly below average in all tests.	★★★½ Serial cable and adapter; handy setup information.	★★★★ V.34, V.FC, Caller ID, and MNP10 supported.	★★★½ Get this gem for the extras.
Optima 288 V.34/V.FC+ Fax Hayes *Reader Service No. 855*	$579	No	No	Class 1	★★★½ Had trouble connecting to other modems.	★★★½ Good software.	★★★★ V.34, V.FC, and ETC supported.	★★★½ Good file-transfer speeds.
Cardinal 28.8 Fax/Modem Cardinal Technologies *Reader Service No. 856*	$179	Yes	No	Class 1 & 2	★★★ Comparatively slow in bidirectional throughput tests.	★★★½ Includes good communications software.	★★★ V.34, V.FC, and MNP 10 supported.	★★★ Smallest of the best at only 5 by 5.25 inches.
FaxModem V.34 MacPack Zoom Telephonics *Reader Service No. 857*	$299	No	No	Class 1 & 2	★★½ Call-connect reliability was its downfall.	★★★½ Comit and WinFax Lite software for easy setup.	★★★ V.34, V.FC, and MNP 10 support.	★★★ Better than a V.32bis and some V.FC modems.
Smart One 2834 FX Best Data Products *Reader Service No. 858*	$399	No	No	Class 1 & 2	★★½ Poor compatibility and speed.	★★★ QuickLink software OK, but does not support Zmodem.	★★★ Both V.34 and V.FC supported.	★★★ Average.
V.34 External BocaModem Boca Research *Reader Service No. 859*	$319	No	No	Class 1 & 2	★★½ Low score on compatibility with other modems.	★★★½ Serial card and cable let you use it right out of the box.	★★★ Both V.34 and V.FC supported.	★★★ Simple plug and go.

Perfect Additions

Want more from your desktop system? Make sure you have the best CD-ROM drive, scanner, sound card, and modem your budget can accomodate. Here's how to decide which one is best for your needs.

CD-ROM Drives Quad-speed is the secret here. It's not much of a secret anymore, either, with some prices now below $500 and industry experts predicting $200 drives by year-end. Our performance tests showed that the drives were all very close in access time and even closer in transfer rate.

Color Scanners Watch for high true resolution (as opposed to interpolated resolution) and software that you can learn easily. And with scanners, higher prices don't necessarily translate to better performance.

Sound Cards It's worth paying even a couple of hundred dollars extra to get a sound you like. Sound quality varies considerably from card to card. Make sure you pair good speakers with your sound card.

Modems A 28.8Kbps modem should be able to sustain more than 100Kbps when you have compression enabled. You'll find a wide range of features, from flash ROMs that let you upgrade a modem's firmware rather than purchase a new modem, to LCDs that keep you apprised in English of what the modem's doing. These extras add to the price, but they also pay for themselves in the long run.

DECISION MAKER

CHOOSE A **PERIPHERAL** THAT SUITS YOUR BUSINESS NEEDS

1 Choose the type of peripheral you want.	2 Choose the most important factor.	3 What else is important?	4 For your needs, the best product to buy is . . .
CD-ROM Drive	Performance	Price	Plextor 4Plex 256
		Usability	Toshiba XM-3501E
	Price	Usability	Plextor 4Plex 256
		Performance	Plextor 4Plex 256
Color Scanner	Performance	Price	HP ScanJet 3c
		Usability	HP ScanJet 3c
	Price	Performance	Envisions ENV6600S
		Usability	HP ScanJet 3c
Sound Card	Performance	Usability	Sound Blaster AWE32
		Price	Turtle Beach Tropez
	Usability	Performance	Orchid SoundWave 32Pro
		Price	Logitech SoundMan Wave
Modem	Performance	Usability	Motorola V.3400
		Price	ProClass 288MT
	Usability	Performance	Motorola V.3400
		Price	Microcom DeskPorte

Advertisement, Adobe, Inc.

AGFA STUDIOSCAN I	AGFA STUDIOSCAN II	AGFA ARCUS II	AGFA VISION 35	AGFA HORIZON PLUS	AGFA SELECTSCAN
OPTICAL RESOLUTION					
300 x 600	400 x 800	600 x 1200	3175 x 3175	1200 x 1800	720 to 4000 ppi
BITS PER PIXEL					
24	30	36	36	36	48
MAX SCANNING AREA (TRANSMISSIVE)					
8.5" x 14" (8" x 10")	8.5" x 14" (8" x 10")	8.3" x 14" (8" x 10")	(40 x 40 mm)	11.7" x 16.5" (9.5" x 10")	8.3" x 14" (8" x 10")
BUNDLED SOFTWARE*					
Photoshop™ LE FotoTune LE FotoLook FotoSnap	Photoshop LE FotoTune Light FotoLook FotoSnap	Photoshop FotoTune Light FotoLook	FotoLook	FotoTune FotoLook	SelectScan 1.0 FotoTune FotoLook
TRANSPARENCY MODULE					
Optional	Optional	Standard	N/A	Standard	Standard
ADF (AUTOMATIC DOCUMENT FEEDING)					
Optional	Optional	N/A	N/A	N/A	N/A
PRODUCT PROFILE					
Entry-level color scanner	Enhanced entry-level color scanner	Advanced desktop color scanner	Production-capable 35 mm color slide scanner	Versatile large-format color scanner	Top-quality color production scanner

IF YOU DON'T SEE IT, YOU DON'T NEED IT.

Looking to buy — or sell — a new color scanner? Only Agfa can give you a choice like this, from our easy-to-use, entry-level StudioScan series to the revolutionary new SelectScan for high-end color production.

Each of these scanners is designed to compete at the top of its category. And each one comes with Agfa scanning and color management software you just won't find anywhere else. They also come with another Agfa exclusive — our new, 42-page *Introduction to Desktop Scanning* — which takes you, step-by-step, through the entire scanning process.

If you're in the market, you can see why it pays to buy Agfa; if you're a dealer, you can see why it pays to sell Agfa. Because no matter what you need a scanner for, your best choice is the one with our name on it. If you're interested in receiving scanner literature, call 1-800-685-4271, ext. 1868, or fax (508) 583-4168.

AGFA The complete picture.

Circle 168 on reader service card.

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Information: Getting More Data on Top Systems, Printers, and Peripherals

CONTACTS

HOW TO FIND THE **DESKTOP SUPERGUIDE** VENDORS

AcerAcros 4694
Acer America
(800) 733-2237, (408) 432-6200
$1,799 est. street price
Reader Service No. 764

AcerAcros Pentium 75
Acer America
(800) 733-2237, (408) 432-6200
$3,499 est. street price
Reader Service No. 768

AcerPower Pentium 100
Acer America
(800) 733-2237, (408) 432-6200
$3,995 est. street price
Reader Service No. 715

ActionLaser 1400
Epson
(800) 289-3776, (310) 782-0770
$849 est. street price

Bravo LC 4/66d
AST
(800) 876-4278, (714) 727-4141
$1,500 est. street price
Reader Service No. 785

Brother HL-660
Brother Int'l
(800) 276-7746, (908) 356-8880
$1,088 est. street price
Reader Service No. 802

Canon BJC-600e
Canon Computer Systems
(800) 848-4123, (714) 438-3000
$549 est. street price
Reader Service No. 816

Canon IX-4015
Canon Computer Systems
(800) 848-4123, (714) 438-3000
$799 est. street price
Reader Service No. 839

Cardinal 28.8 Fax/Modem
Cardinal Technologies
(717) 293-3000, (717) 293-3049
$179 est. street price
Reader Service No. 826

Celebris 575
Digital Equipment Corp.
(800) 344-4825, (508) 493-5111
$2,717 est. street price
Reader Service No. 771

Celebris XL 590
Digital Equipment Corp.
(800) 344-4825, (508) 493-5111
$4,399 est. street price
Reader Service No. 776

ColorPoint 2 PSF
Seiko
(800) 888-0817, (408) 922-5800
$4,999 est. street price
Reader Service No. 822

CompuAdd C466D
CompuAdd
(800) 627-1901, (512) 250-1489
$1,795 est. street price
Reader Service No. 788

CompuAdd CP75p
CompuAdd
(800) 627-1901, (512) 250-1489
$3,304 est. street price
Reader Service No. 772

CompuAdd CP90p
CompuAdd
(800) 627-1901, (512) 250-1489
$4,100 est. street price
Reader Service No. 757

Comsphere 3800 Plus
AT&T Paradyne
(800) 482-3333, (813) 530-2000
$895 est. street price
Reader Service No. 853

DECcolorwriter 120ic
Digital Equipment Corp.
(800) 344-4825, (508) 493-5111
$355 est. street price
Reader Service No. 818

DECcolorwriter 1000
Digital Equipment Corp.
(800) 344-4825, (508) 493-5111
$3,999 est. street price
Reader Service No. 820

DEClaser 5100
Digital Equipment Corp.
(800) 344-4825, (508) 493-5111
$1,599 est. street price
Reader Service No. 803

DECwriter LJ 90ip
Digital Equipment Corp.
(800) 344-4825, (508) 493-5111
$340 est. street price
Reader Service No. 811

DeskJet 540
Hewlett-Packard
(800) 752-0900, (415) 857-1501
$365 est. street price
Reader Service No. 807

DeskJet 560C
Hewlett-Packard
(800) 752-0900, (415) 857-1501
$599 est. street price
Reader Service No. 815

DeskJet 1200 C/PS
Hewlett-Packard
(800) 752-0900, (415) 857-1501
$1,999 est. street price
Reader Service No. 813

DeskPorte Fast
Microcom
(800) 822-8224, (617) 551-1000
$425 est. street price
Reader Service No. 850

Deskpro XE 4100
Compaq
(800) 345-1518, (713) 370-0670
$2,868 est. street price
Reader Service No. 777

Deskpro XL 590
Compaq
(800) 345-1518, (713) 370-0670
$3,699 est. street price
Reader Service No. 760

Dimension 466 DM
Dell
(800) 289-1260, (512) 338-4400
$1,418 est. street price
Reader Service No. 781

Dimension XPS P75
Dell
(800) 289-1260, (512) 338-4400
$2,043 est. street price
Reader Service No. 769

Dimension XPS P100
Dell
(800) 289-1260, (512) 338-4400
$4,149 est. street price
Reader Service No. 718

Elite P5-75 Office PC
MidWest Micro
(800) 728-8384, (513) 368-2309
$3,099 est. street price
Reader Service No. 770

Envisions ENV6600S
Envisions
(800) 365-7226, (415) 692-9061
$529 est. street price
Reader Service No. 836

Epson ES-1200C Pro
Epson
(800) 289-3776, (310) 782-0770
$1,299 est. street price

Evolution V ST/75
ALR
(800) 444-4257, (714) 581-6770
$2,723 est. street price
Reader Service No. 773

Evolution V ST/90
ALR
(800) 444-4257, (714) 581-6770
$4,569 est. street price
Reader Service No. 759

ExecJet IIC
Lexmark Int'l
(800) 358-5835, (606) 232-2000
$379 est. street price
Reader Service No. 817

Express XV 4/66d
ALR
(800) 444-4257, (714) 581-6770
$ 1,995 est. street price
Reader Service No. 789

FaxModem 288
Supra
(800) 727-8772, (503) 967-2400
$244.95 est. street price
Reader Service No. 814

FaxModem V.34 MacPack
Zoom Telephonics
(800) 631-3116, (617) 423-1072
$299 est. street price
Reader Service No. 857

Gateway P4D-66
Gateway 2000
(800) 846-2000, (605) 232-2000
$1,849 est. street price
Reader Service No. 779

Gateway P5-75 Family PC
Gateway 2000
(800) 846-2000, (605) 232-2000
$2,289 est. street price
Reader Service No. 764

Gateway P5-100XL
Gateway 2000
(800) 846-2000, (605) 232-2000
$3,799 est. street price
Reader Service No. 751

Genesis 466
IPC Austin
(800) 483-9938, (512) 339-3500
$1,539 est. street price
Reader Service No. 782

Globalyst 525
AT&T Direct
(800) 637-2600
$2,319 est. street price
Reader Service No. 786

Globalyst 580
AT&T Direct
(800) 637-2600
$3,185 est. street price
Reader Service No. 774

Image P90
NEC
(800) 632-4636, (508) 264-8000
$3,419 est. street price
Reader Service No. 761

Insight PCI P75 MM
Insight
(800) 927-7848, (602) 902-1176
$3,399 est. street price
Reader Service No. 766

Insight PCI P100 MM
Insight
(800) 927-7848, (602) 902-1176
$5,099 est. street price
Reader Service No. 762

LaserJet 4P
Hewlett-Packard
(800) 752-0900, (415) 857-1501
$1,229 est. street price
Reader Service No. 801

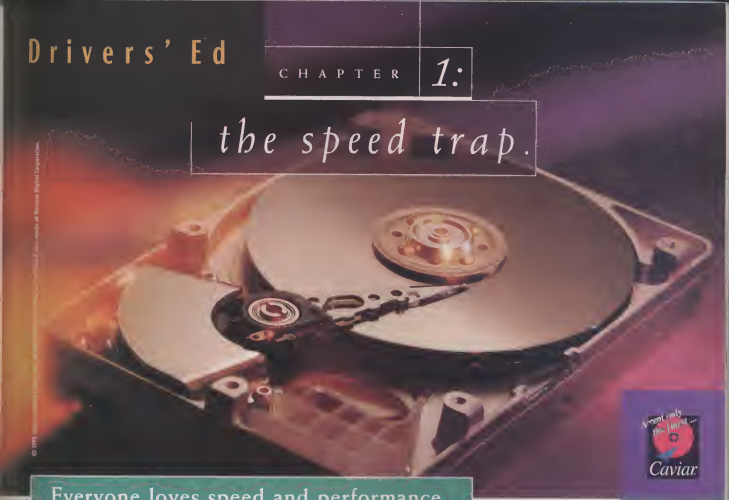
Legend 23CD
Packard Bell
(800) 733-5858, (818) 865-1555
$1,600 est. street price
Reader Service No. 790

MicroFlex-PCI/66G
Micro Express
(800) 989-9900, (714) 852-1400
$1,499 est. street price
Reader Service No. 778

continued on page 172

Drivers' Ed

CHAPTER 1: the speed trap.



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Caviar

Everyone loves speed and performance.

The only problem is that when it comes to drives, some people confuse one for the other.

Some think seek time or the latest host transfer buzzwords like Mode 4 PIO represent a drive's performance. In actuality, a drive's performance is the combination of media rates, buffer sizes and host rates, as well as seek and spin times. So it hardly matters how impressive a drive's individual speed specs are if the other factors hamper its overall performance.

With our extensive expertise in engineering and manufacturing products for entire computer systems, Western Digital is far more committed to a drive's overall, "integrated" performance. This broader perspective enables us to optimize all the drive technologies, so we can deliver drives with the industry's best performance. So before someone tries to pull a fast one on you, remember: there's more to drives than speed alone.

Relative influence of factors affecting drive performance.

Typical random I/O operation.

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For more detailed information on hard drive performance, ask for Driver's Ed: Chapter 1

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Motorola V.3400
Motorola
(800) 451-2369, (205) 430-8000
$895 est. street price
Reader Service No. 849

MultiSpin 4Xe
NEC
(800) 632-4636, (508) 264-8000
$595 est. street price
Reader Service No. 833

Okidata OL 410e
Okidata
(800) 654-3282, (609) 235-2600
$739 est. street price
Reader Service No. 809

Optima 288 V.34/V.FC+Fax
Hayes
(800) 964-2937
$579 est. street price
Reader Service No. 855

Optra R
Lexmark Int'l
(800) 358-5835, (606) 232-2000
$1,749 est. street price
Reader Service No. 800

Pantera 75
Zeos Int'l
(800) 423-5891, (612) 623-9614
$3,495 est. street price
Reader Service No. 765

Pantera 100
Zeos Int'l
(800) 423-5891, (612) 623-9614
$3,795 est. street price
Reader Service No. 752

Personal Computer 350
IBM
(800) 426-2968
$2,799 est. street price
Reader Service No. 787

Personal Computer 750
IBM
(800) 426-2968
$5,230 est. street price
Reader Service No. 753

Phaser 140
Tektronix
(800) 835-6100, (503) 682-7370
$1,675 est. street price
Reader Service No. 812

Phaser 340
Tektronix
(800) 835-6100, (503) 682-7370
$4,995 est. street price
Reader Service No. 819

Pictura 310
Fargo Electronics
(800) 327-4622, (612) 941-9470
$4,995 est. street price
Reader Service No. 823

Pioneer DRM-604X
Pioneer
(800) 444-6784, (310) 952-2111
$995 est. street price
Reader Service No. 834

Plextor 4Plex 256
Plextor
(800) 475-3986, (408) 980-1838
$459 to $519 est. street price
Reader Service No. 831

Poly 486-100 VP4
Polywell
(800) 999-1278, (415) 583-7222
$1,995 est. street price
Reader Service No. 775

Poly 5100D2
Polywell
(800) 999-1278, (415) 583-7222
$4,995 est. street price
Reader Service No. 754

PowerMate VP75
NEC
(800) 632-4636, (508) 264-8000
$2,469 est. street price
Reader Service No. 776

Power System 75
IPC Austin
(800) 483-9938, (512) 339-3500
$2,999 est. street price
Reader Service No. 767

Premmia GX P/90
AST
(800) 876-4278, (714) 727-4141
$4,320 est. street pnce
Reader Service No. 763

PrimeraPro
Fargo Electronics
(800) 327-4622, (612) 941-9470
$1,895 est. street price
Reader Service No. 814

Pro 3-D
Media Vision
(800) 845-5870, (510) 770-8600
$379 est. street price
Reader Service No. 845

ProClass 288MT
Practical Peripherals
(404) 840-9866, (805) 497-4774
$325 est. street price
Reader Service No. 832

ProLaser 6000
Citizen America
(800) 477-4683, (310) 453-0614
$849 est. street price
Reader Service No. 806

ProLinea 4/66
Compaq
(800) 345-1518, (713) 370-0670
$1,678 est. street price
Reader Service No. 791

Quantex QA486DX2/66PM
Quantex
(800) 787-8686, (908) 563-4166
$1,699 est. street price
Reader Service No. 783

Reli 4830T
Relisys
(800) 783-2333, (408) 945-9000
$1,999 est. street price
Reader Service No. 840

ScanJet 3c
Hewlett-Packard
(800) 752-0900, (415) 857-1501
$1,179 est. street price
Reader Service No. 835

ScanMaker IISP
Microtek
(800) 654-4160, (310) 297-5000
$575 est. street price
Reader Service No. 841

Smart One 2834 FX
Best Data Products
(800) 632-2378, (818) 773-9600
$399 est. street price
Reader Service No. 838

Sound Blaster AWE32
Creative Labs
(800) 998-1000, (408) 428-6600
$399.95 est. street price
Reader Service No. 842

SoundFX
Reveal Computer Products
(800) 669-3559, (818) 704-6300
$149.99 est. street price
Reader Service No. 846

Sound Galaxy WaveRider 32+
Aztech Labs
(800) 886-8829, (510) 623-8988
$139 est. street price
Reader Service No. 848

SoundMan Wave
Logitech
(800) 231-7717, (510) 795-8500
$249 est. street price
Reader Service No. 847

SoundWave 32Pro
Orchid Technology
(800) 767-2443, (510) 683-0300
$229 est. street price
Reader Service No. 844

Spectra Star GTx
General Parametrics
(800) 223-0899, (510) 524-3950
$3,995 est. street price
Reader Service No. 821

Sportster V.34
U.S. Robotics
(800) 877-2677, (708) 982-5010
$339 est. street price
Reader Service No. 811

StudioScan II
Agfa
(800) 685-4271, (201) 440-2500
$859 est. street price
Reader Service No. 838

Stylus Color
Epson
(800) 289-3776, (310) 782-0770
$699 est. street price

SuperScript 660
NEC
(800) 632-4636, (508) 264-8000
$599 est. street price
Reader Service No. 804

T9008 Laser Printer
Mannesmann Tally
(800) 843-1347, (206) 251-5500
$1,499 est. street price
Reader Service No. 810

TechJet Personal
CalComp
(800) 932-1212, (714) 821-2000
$699 est. street price
Reader Service No. 805

Thunderbolt
Tegram System
(800) 824-7267, (714) 258-3222
$3,945 est. street price
Reader Service No. 750

Toshiba XM-3501E
Toshiba
(800) 999-4100, (714) 583-3000
$545 est. street price
Reader Service No. 832

Tropez
Turtle Beach
(800) 645-5640, (717) 767-0200
$249 est. street price
Reader Service No. 843

V.34 External BocaModem
Boca Research
(407) 997-6227
$319 est. street price
Reader Service No. 859

Venturis FP 466
Digital Equipment Corp.
(800) 344-4825, (508) 493-5111
$2,548 est. street price
Reader Service No. 780

Vista-S6 LE
Umax
(800) 562-0311, (510) 651-8883
$799 est. street price
Reader Service No. 837

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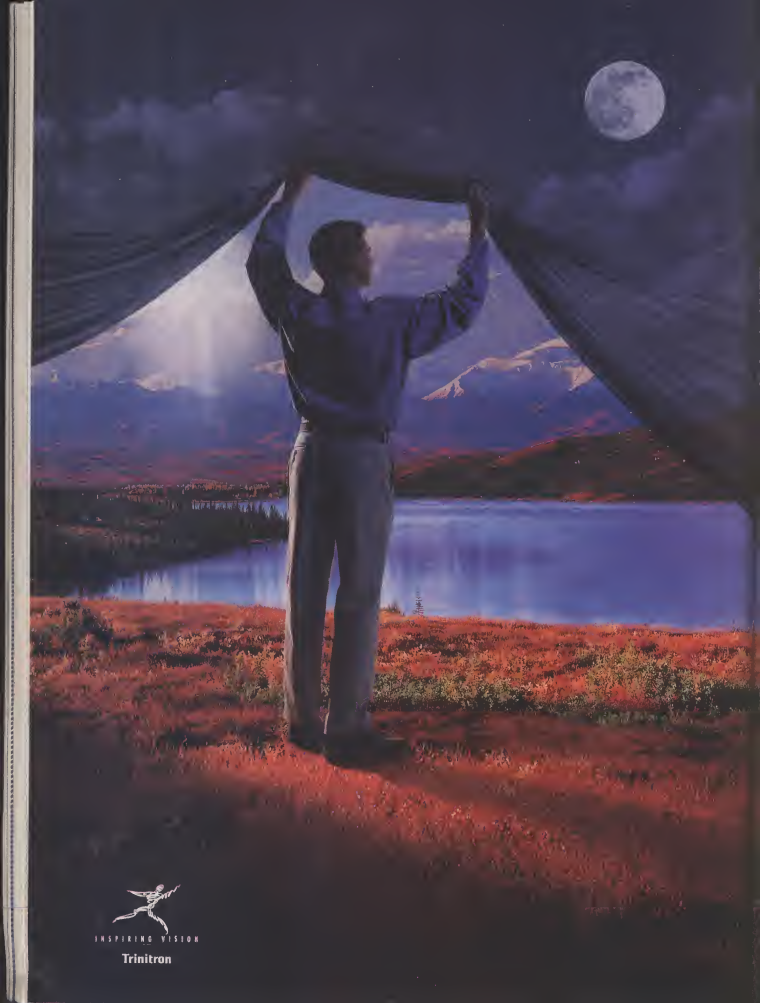
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REALITY?

IT'S ALL HOW YOU LOOK AT THINGS.

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Windows 95:

SYNOPSIS

PERFORMANCE: *Great resources, so-so speed.* **178**

COMPATIBILITY: *Easy Plug and Play.* **180**

NETWORKING: *The right connections made simple.* **184**

THE COMPETITION: *The operating system of choice for early adopters.* **186**

FINAL ANALYSIS: *Choose your next operating system.* **188**

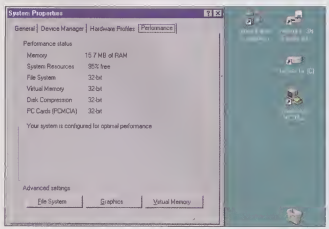
Officially, it's known as the Windows Preview Program (WPP). Unofficially, you could call it The Great 32-Bit Stampede of 1995. It's Microsoft's way of easing Windows 95 out of beta testing and into the real world—but don't expect to go into a software superstore and walk out with a shrink-wrapped copy just yet. However, if you responded promptly to Microsoft's terse announcement in late March, you may already have your own copy of Windows 95. If you missed it . . . well, you may just have to wait until later this year to see what all the fuss is about.

PC Computing received one of the first copies of this publicly available release of Windows 95. Over the course of two weeks, we installed it on more than a dozen test machines: antique 386s, desktop and notebook 486s, and some shiny new Pentiums. Our objective was to answer one burning question: Is this version of Windows 95 ready for prime time?

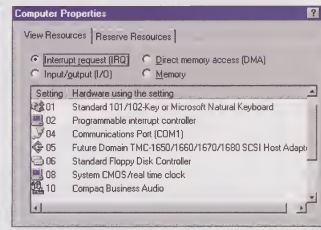
It's not a trivial question. Do you really want to trust your productivity and priceless data to an operating system that's still officially under development? Or is now the time to look at other 32-bit alternatives? This beta will let you judge for yourself whether Microsoft is on the right track to the official August release.

Corporate Trials What is the Windows Preview Program? In all, 400,000 copies of the third major beta release of Windows 95 were manufactured, for delivery mostly to corporate sites anxious to try out a new operating system in a controlled environment, away from mission-critical applications and data.

PERFORMANCE ANXIETY: It has gobs of memory, enough system resources to choke a pair of Pentiums, plus four big chunks of crucial 32-bit code. Windows 95 ought to be a screamer. So why doesn't it run faster?



UNNATURAL RESOURCES: The messy underpinnings of the Intel platform are not gone, but at least they're better organized. Windows 95 lets you see at a glance where your precious IRQs and DMAs have gone.



It's Here (Sort Of)

Anyone with a copy of the WPP release will have a separate support line to call for help with problems. It's not exactly a beta test; a smaller group of some 50,000 testers is working with Microsoft on a steady stream of beta releases designed to find and fix the remaining bugs in Windows 95.

If you try out this version of Windows 95, you'll see virtually all the major features that will be in the retail release, but not necessarily in their final form. Areas that are still likely to change include the Microsoft Network and the Exchange client (a universal e-mail and fax front end). The Remote Access Server is not in now, and may not make it into the shrink-wrapped package. And the roster of applets and games included may change before the official release, as well.

Exact details of pricing and availability are still up in the air, and probably won't be settled until the last minute, which as of press time was expected to be sometime in August.

Except for the absence of shrink-wrap and printed manuals, this release of Windows 95 looks remarkably polished. The installation routine is slick, even to the point of including promotional screens and exhortations to register online. Most "Under Construction" signs have been tidied up. Even the help system is fairly complete.

How We Tested By now, unless you've been living in a cave near Boca Raton, you've read more than you ever wanted to know about the Windows 95 graphical user interface. You know about the Start button and the Taskbar and right–mouse-button menu shortcuts and the Explorer.

We'll measure the effectiveness of the new interface in our Usability Labs in an upcoming issue. Meanwhile, we'll focus on the issues that matter the most once you get past the interface.

Regarding performance, Microsoft says Windows 95 will run in a mere 4MB of RAM. It's also stuffed with 32-bit replacements for the file system, disk cache, disk compression, and communications subsystems. Do those spell improvements over Windows 3.1 or Windows for Workgroups 3.11?

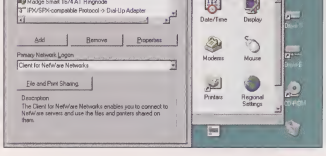
What about compatibility? Does Plug and Play work? How does it handle the hardware that's already in your system? How about your current 16-bit Windows and DOS applications?

To test networking power, we tried connecting to every computer we could find. We had plenty of NetWare servers, NT machines, and other Windows workstations to try, as well as a universe full of faraway Sun systems reachable through the Internet. We were out of luck with Macs and OS/2 workstations, for which Windows 95 doesn't offer built-in support.

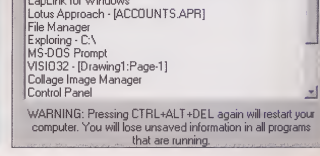
Anyone who has struggled to connect Windows to any kind of network knows how painful the process can be. Read on to see if this release of Windows cures those ills.

BY ED BOTT

NO NOVELL? That's right—Windows 95's NetWare client software is strictly Microsoft's handiwork. You can use Novell's ODI drivers instead, but the 32-bit versions are faster and don't use any conventional memory.



MORE WINDOWS: With those silly 64K resource heaps out of the way, you can run more applications without crashing. If one hangs, press Ctrl-Alt-Del to pop up this dialog box which lets you kill a task, or gracefully shut down.



Fast? Just Wait...

Windows 95 isn't running at Indy 500 speeds yet. The shiny new 32-bit engine is stoked and ready to run—key 32-bit pieces of Windows 95 include the VFAT (virtual file allocation table) file system and enhanced disk cache from Windows for Workgroups 3.11, an enhanced CDFS (CD file system), protected-mode disk compression, and even crisp new PC Card drivers.

But in this beta release, there are also large chunks of code designed to help track down bugs and guarantee compatibility, and those tend to weigh down the rest of the operating system. The result is that the Preview edition of Windows 95 consistently runs 16-bit Windows applications a bit slower than Windows for Workgroups 3.11 does. (Either one, however, is faster than Windows 3.1.)

The Right Configuration As soon as we received the latest beta of Windows 95, we rushed it into the lab and onto a 33MHz 386; a 486, also running at 33MHz; and a 90MHz Pentium. On each machine, we installed Windows 3.1, Windows for Workgroups 3.11, and Windows 95, then ran ZD Labs' Winstone 95 benchmark suite. The results were surprising.

Microsoft says Windows 95 will run on a 386 with 4MB of RAM. True, but we found the actual performance under those circumstances to be unacceptable. On Windows for Workgroups and Windows 95 alike, the Winstone suite runs three times faster when you boost RAM to 8MB. And even simple operations like opening a Word file took twice as long to complete on a 4MB Windows 95 PC. Consider 8MB the bare minimum for Windows 95.

Abundant Resources Some speed demons may prefer Porsches, but if you're concerned about mission-critical data, you'll demand the software equivalent of a Volvo—safe and stable. After all, speed doesn't matter if your application bursts into flames when you try to open a new file.

The most glaring design flaw in Windows 3.1 is its dependence on three puny 64K blocks of memory where system resources are stored. Under Windows 95, those resource heaps have been completely rebuilt, and we were dazzled by the results. We still experienced occasional problems with system resources, but only after we had stressed the system far beyond the level where Windows 3.1 would have hit the wall.

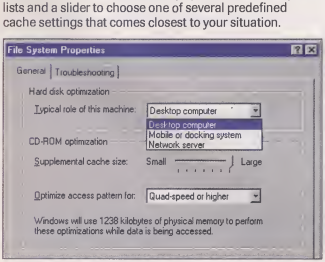
Under Windows 3.1, you may run into resource problems after opening as few as three applications. Under Windows 95 we were able to open more than 50 windows. We were able to run as many as 15 major applications without experiencing instability or poor performance.

Best of all, Windows 95 cleans up after untidy programs. Unlike Windows 3.1, we didn't have to restart Windows to reclaim system resources.

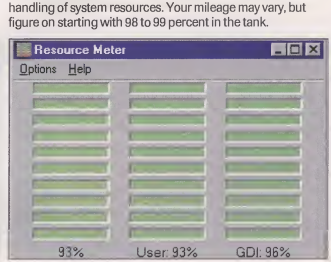
Performance Puzzles If you're looking forward to Windows 95 because you expect it to outrun the version of Windows you're running now, you may be disappointed. In our tests, the Preview edition of Windows 95 was about as fast as Windows for Workgroups 3.11 on 386s and 486s. On a Pentium PC it was roughly 10 percent slower overall.

Microsoft promises that the final version of Windows 95 will be at least as fast as Windows for Workgroups 3.11, with a decided speed edge on fast machines. We'll wait and see.

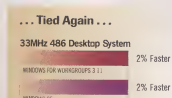
TUNE-UP TRICKS: Want pinpoint control of the 32-bit disk and CD-ROM caches? Sorry—you'll have to use pick lists and a slider to choose one of several predefined cache settings that comes closest to your situation.

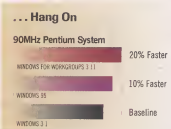


GREEN MEANS GO: The Monitor program in the Windows 95 Resource Kit graphically displays Windows 95's improved handling of system resources. Your mileage may vary, but figure on starting with 98 to 99 percent in the tank.



You may be stuck in the **Windows 3.1** slow lane for no reason. Our lab tests showed Windows 95 and Windows for Workgroups to be consistently 10 to 20 percent faster than the original. And when it comes to **386s and 486s,** Windows 95 and Windows for Workgroups ran 13 common business applications in a virtual dead heat. On a **Pentium,** however, Windows 95 isn't tuned enough to keep up with the faster processor's flat-out pace.



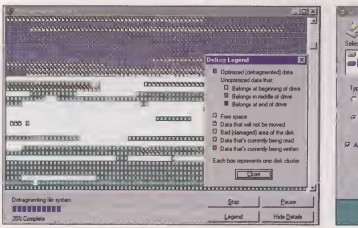


Windows 3.1: If performance matters, it's time to upgrade. Some Windows 95 technologies, notably the VFAT 32-bit disk access and VCACHE (the protected-mode replacement for SmartDrive) have been a part of Windows for Workgroups 3.11 since late 1993. So even if you're not ready for Windows 95 today, you'll get a noticeable speed boost from Windows for Workgroups.

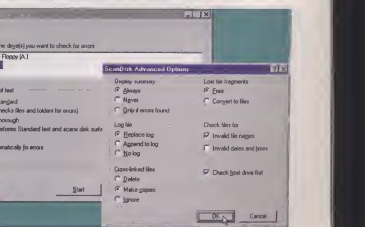
386s and 486s: ZD Labs' Winstone 95 benchmarks measure how long it takes to complete a grueling suite of real-world tasks using 13 common 16-bit Windows applications. We tested each version of Windows using 33MHz 386s and 486s, and found Windows 95 to be roughly as fast as Windows for Workgroups 3.11. Had we run 32-bit applications, though, it's likely Windows 95 would have edged ahead.

Pentium: Why did Windows 95 run about 10 percent slower than Windows for Workgroups? Microsoft blamed it on the 16-bit test code, while *PC Computing*'s lab experts also found that the video card and hard drive were bottlenecks. Will you be satisfied with the performance of Windows 95? Maybe, but only if Microsoft aggressively tunes Windows 95's performance before its retail release later this year.

DEFRAG'S THE THING: Windows 95's built-in disk defragger works in the background to rearrange the contents of a hard disk for faster access. Good thing it's around, because older disk utilities will mangle long filenames.



CHECKLIST: The new graphical ScanDisk utility runs rings around its character-based predecessor. Naturally, it recognizes and repairs damaged filenames; it also lets you control which types of errors are fixed in each pass.



Smooth Transition?

Here's the big question: Will Windows 95 work with the hardware that's already on your desktop and the time-tested DOS and Windows software you count on for everyday work?

It Does DOS What more need we say? Windows 95 passed the Doom test with flying colors. For more pedestrian productivity applications, the results are generally better than you'll see under Windows 3.1. You may never crash into another out-of-memory message, for example, because Windows 95's DOS subsystem doesn't need RAM-hogging real-mode mouse, CD-ROM, and network drivers.

Some DOS applications simply won't run under Windows 95, usually because they try to communicate directly with your hardware. In that case, Windows 95 lifts a page from the OS/2 playbook by offering customizable DOS sessions that suspend Windows completely, optionally loading custom AUTOEXEC.BAT and CONFIG.SYS files. This option is not as versatile as the OS/2 solution, which lets you use separate startup files without rebooting, but it's enough to ensure that a single balky DOS application will run. If you want to get to a DOS prompt, go ahead: That's one of the choices on the Shut Down dialog box.

The lion's share of beta testing on Windows 95 has been devoted to tracking down compatibility problems between the new operating system and your old 16-bit Windows applications. So we weren't surprised to find that Windows 95 cooperates well with virtually every entry on the software best-seller list.

But that doesn't mean that every 16-bit Windows application runs flawlessly. For that matter, it doesn't mean they run at all. Shell replacements like Norton Desktop for Windows no longer work, for example, nor do low-level disk utilities such as Norton's Disk Editor. Others choke because performance-obsessed programmers took shortcuts around some of Windows' standard tools in their applications, and those shortcuts only worked in Windows 3.1.

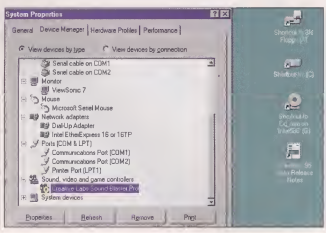
Problems range from merely annoying (the check register lists in Managing Your Money don't redraw properly) to fatal (Visioneer's PaperPort software prints a black page if you drag a scanned page thumbnail to the printer icon).

What do you do if an application you can't live without can't live with Windows 95? Well, you could let your work pile up while you wait for an upgrade. Or you could set up your PC to let you choose the Windows version you prefer at boot time.

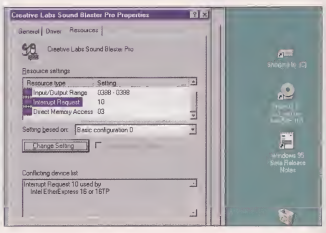
Slim 32-Bit Pickings The tidal wave of 32-bit Windows 95 applications will crest later this year. But for now there aren't that many floating around, and many of them are from Microsoft. So we were hardly surprised that our collection of 32-bit Windows NT applications worked well under Windows 95.

Microsoft Word 6.0 and Excel 5.0 support long filenames, although they don't take advantage of anything else in the Windows 95 user interface. A shareware program, Nico Mak Computing's WinZip utility, was much more aware of the new interface standards, with full right-mouse-button support and your choice of long or 8-dot-3 filenames. And beginning with the March 95 release, Microsoft's monthly TechNet CD-ROMs are including a Windows 95-specific browser.

TROUBLE AHEAD? The first warning of hardware hassles: a bright yellow exclamation point in the Windows 95 Device Manager (a red X would mean the device is deliberately disabled). Click on the Properties button to fix the problem.



CONFLICT RESOLUTION: With Windows 3.1 and DOS, tracking down IRQ and DMA conflicts requires pencil, paper, and a voodoo doll. Windows 95 catches most of these conflicts and lets you switch to an unused setting.



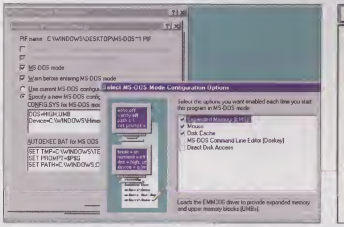
On a true **Plug-and-Play** system, with an up-to-date BIOS and well-designed peripherals, adding new hardware is a piece of cake. With older devices, though, we hit some **rough spots** in Windows 95's ability to recognize hardware. Windows 95 includes drivers for more than 1,000 devices, but if you're saddled with an office full of equipment that never hit the best-seller list, don't expect that **legacy hardware** to be on Windows 95's list of drivers, either. You may have to make do with the old Windows 3.1 drivers.

Plug and Play: On our test systems, the Plug-and-Play hardware worked flawlessly. A 32-bit Adaptec SCSI adapter practically installed itself. We attached a Pioneer DRM-604X six-disc changer and a Plextor 4Plex 256 CD-ROM, and Windows 95 recognized both models, installing appropriate drivers without human intervention. When we inserted a variety of PC Cards into a Toshiba T4600C notebook, the 32-bit PCMCIA drivers assigned a free IRQ and base memory address on the fly.

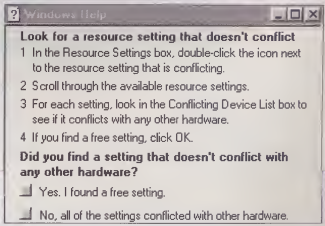
Rough Spots: Windows 95's automatic hardware detection wasn't flawless. It failed to detect a Diamond Stealth Pro 64 video card when we installed it. It also missed the Intel and Artisoft network interface cards and a low-end Trantor SCSI card we added to the test system. In all cases, though, we were able to add support by manually picking the new hardware from a list.

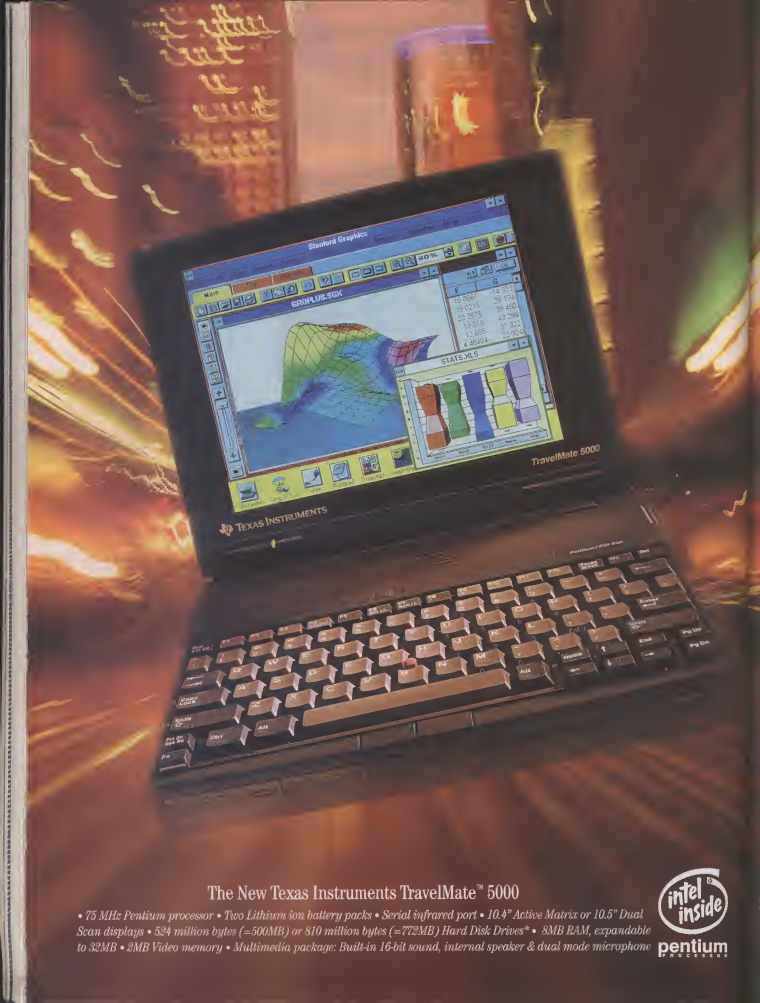
Legacy Hardware: Windows 95 includes drivers for more than 1,000 devices, but it doesn't have everything. There were no drivers for Hercules's Graphite Pro video card, or Turtle Beach's Tropez or Orchid's SoundWave 32 Pro sound cards. In those cases, the Windows 3.1 drivers worked properly, although in one case we had to intervene manually to resolve an interrupt conflict between a sound card and a network adapter.

DOS A LA MODE: How do you handle a stubborn old DOS program? With brute force. Windows 95's MS-DOS mode lets you set Windows aside while you run a balky DOS program, complete with real-mode drivers.



SUPPORT? DIAL F1: The Troubleshooting Wizard asks the same series of Yes/No questions any competent support engineer would try. Click on a button to jump straight to the dialog box where you can fix the conflict.





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Circle 163 on reader service card.

Cast a Wider Net

Right out of the box, Windows 95 supports peer-to-peer networking—sharing files, printers, and fax modems. But for most businesses, the biggest payoff comes when connecting to existing corporate networks. If your office depends on NetWare or the Internet, Windows 95 is a model citizen.

Hello, NetWare? We were able to connect Windows 95 PCs to existing NetWare networks without using any real-mode client software or any Novell code. Microsoft's built-in NetWare client software runs in protected mode and does just about anything you could ask of it.

Here's how to get around: Right-click on the server icon to see its name, NetWare version, and the number of clients attached. Double-click on the same icon to log in and browse through the server's volumes. If the optional OS/2 Name Space is installed on the server, Windows 95 clients can read and write long filenames.

Drive mapping? Who needs it? In batch files and dialog boxes, use UNC names (\\SERVER\VOLUME) instead of drive letters to browse NetWare volumes or launch server-based programs. (The same technique works with NT servers and shared Windows 95 resources.) Of course, if you really want to map a NetWare volume to a drive letter, you can do that with a right–mouse-button click that brings up a dialog box.

Toss Novell's LOGIN utility; when you log in to Windows, you also log in to NetWare. If you use the same password for NetWare and Windows, you'll have to enter it only once. Any custom settings from your NET.CFG file will show up in the Windows 95 registry, and it will process NetWare login scripts.

Internet Made Easier Connecting to the Internet on a Windows 3.1 PC takes time and money. It also exacts a heavy toll on brain cells. First you have to purchase a third-party protocol stack and Windows socket services, then you have to install and configure the whole mess. On a scale of 1 to 10, the process would earn a degree-of-difficulty rating of around 13.

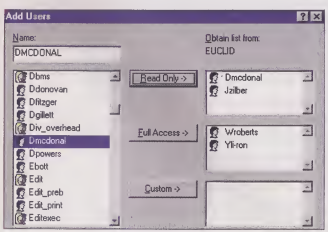
Under Windows 95, you won't need any additional software to make the initial connection. Microsoft's TCP/IP stack is one of the options under the Control Panel Network icon, and socket services are built in. And thanks to a well-organized installation interface, complete with Wizard, the degree of difficulty is about 5—slightly easier than resetting the clock on a VCR.

We configured multiple Windows 95 workstations for Internet access in less than 10 minutes each, then specified a Domain Name Server on *PC Computing*'s internal network. From there, we used NetScape and NCSA Mosaic to browse the World Wide Web at will.

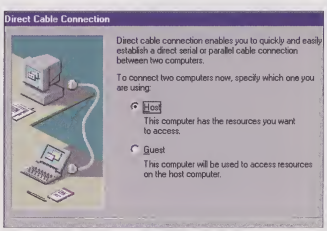
We also configured Windows 95's Dial-Up Networking client to connect to a Windows NT server over a standard phone line. With V.34 modems at either end, we were able to browse the Net, connect to NetWare servers, NT servers, and other Windows workstations—all at a steady 28.8Kbps.

There are no third-party Internet providers that are publicly supporting Windows 95 yet, but it should be easy to make that connection because the new Windows fully supports Point-to-Point Protocol (PPP) connections. And once Windows 95 is widely available, those providers will have a powerful incentive to tailor their services to the Windows 95 interface.

THE RIGHTS STUFF: When you have File and Printer Sharing for NetWare networks installed, Windows 95 lets you control access to a Windows 95 PC through the user and password list maintained on a NetWare server.



STRAIGHT TALK: Who needs a network card? Use Direct Cable Connection to hook up two PCs using a parallel or serial cable instead. The Setup Wizard is about as idiot-proof as computer software can get.



Windows 95 does networking in the broadest sense of the word. First, there's the easy Internet access, which will get easier when **UUNET** and Microsoft team up later this year. Then there's the **NetWare** client that does some surprising peer-to-peer tricks. And when you just want an easy way to share resources with other Windows workstations, you have your choice: Do it **over the wire,** using a parallel cable and the built-in Direct Cable Connection, or do it **over the phone,** with Windows 95's Dial-Up Networking.

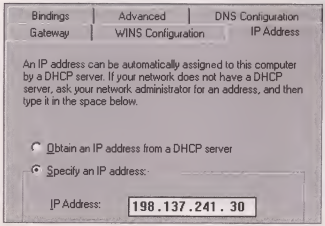
UUNET: Late this year or early in 1996, Microsoft plans to offer simultaneous access to the Internet and the Microsoft Network through a worldwide PPP-based system. UUNET, a well-known name on the corporate side, is building the infrastructure.

NetWare: Concerned about peer-to-peer security? With the Windows 95 NetWare client, you can share resources on a Windows 95 PC and assign security via the user list on a NetWare server. You get all the benefits of NetWare's security without the high cost of a new server license.

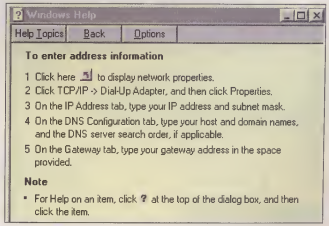
Over the Wire: We had no problems hooking up two PCs with the Direct Cable Connection. The Setup Wizard is a usability home run: Once connected, we were able to share printers and files over a parallel cable.

Over the Phone: Unfortunately, the Windows Preview Program beta doesn't include the DLL that lets Windows 95 act as a dial-up server. Microsoft supplied us with a beta copy of this code, which will probably be packaged separately from the retail version of Windows 95. Despite numerous attempts, though, we were unable to connect two Windows 95 test workstations across a phone line.

EASIER INTERNET: Do you think the first two letters in TCP/IP stand for *Terribly Complicated?* At least the Windows 95 protocol stack is well organized. Gather the necessary numbers, enter them in this dialog box, and get wired.



BY THE NUMBERS: Got a TCP/IP headache? Then fire up the Windows 95 Help system and follow the step-by-step instructions. The button on the first line ("Click here . . .") lets you jump straight to the TCP/IP setup screen.



The 32-Bit Question

Hey, you! Yes, you there—with the suspenders *and* the belt! Why read any further? If you're afraid to take a few risks, you don't need to think twice about your operating system. The conservative OS choice is DOS and Windows 3.1. So why are we even having this discussion?

On the other hand, if you're willing to take a few risks in the pursuit of powerful computing, trade in the belt and suspenders for a bungee cord and get ready to take the plunge. Once you get past Windows 3.1, you have your choice of four more powerful operating systems. Three of them come from Microsoft, and the fourth, IBM's OS/2 Warp, depends on Microsoft's Windows code to run Windows applications. All of them promise to run your current Windows applications and a whole lot more.

Does Windows 95 really belong in the same company as shipping operating systems? With 450,000 copies in circulation, only the most determined cynic would continue to call it vaporware. True, you can't buy it at Egghead, but anyone who's serious about evaluating Windows 95 can probably scare up a copy. Is it worth the effort, you ask?

We think it is. Especially when you look at your operating system choices, up close and personal:

Windows 3.1 An orphan in the making. The interface is aging, performance is lagging, and it has no networking smarts. Its lone edge? Unlike every other operating system on this page, Windows 3.1 really does run on a 4MB PC. The belt-and-suspenders crowd will keep Windows 3.1 on the best-seller lists until Windows 97 hits the streets.

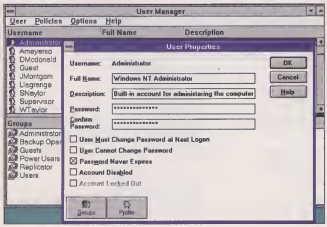
Windows for Workgroups 3.11 The interface is aggravating, but it's time-tested and you can take your pick from a jillion compatible applications. It's not bad in the networking department, either, although you'll have to jump through a few hoops to set up an Internet connection. It's the best choice for most of us until Windows 95 is widely available and fully supported.

Windows 95 The new interface improves on the very best from Sun, Apple, and IBM, and has been polished with more usability testing than any piece of software ever written. Plug and Play works (mostly), as do the new multimedia pieces. The NetWare client in Windows 95 is nothing short of astonishing. If you live and die by Windows, and your heart doesn't palpitate at the thought of trusting your priceless data to a beta operating system, this one's for you.

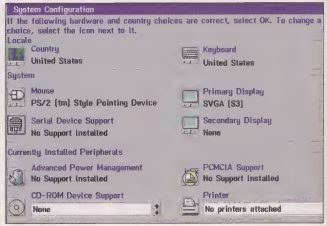
OS/2 Warp For the technologically adventurous only. It's got the right stuff, 32-bit-wise, with an undeniably elegant interface to boot. The one-button Internet access is slick, although we'd rather choose our own provider. Too bad it's still so hard to get your peripherals Warped. Don't hold your breath waiting for new OS/2-specific applications, either.

Windows NT It's big. Real big. Windows NT needs a pile of hardware just to wake up in the morning, and the more hardware you throw at it, the better it runs. It's the future for client-server applications. That old interface looks pretty clunky compared to Windows 95 or OS/2 Warp, though, and not all your 16-bit applications will run. It makes a great server, but you're a world-class wonk if you put it on your desktop as it is today.

SAFE AND SECURE: The User Manager lets you set passwords and properties for each user, making Windows NT a true multiuser system. Multiple users can access a single system, keeping their customization and their data secure.



HARD WARP: While IBM's OS/2 Warp has a clean, well-organized interface for adding new hardware, it can't match Windows 95's assortment of supported devices and included drivers, and it doesn't do Plug and Play—yet.



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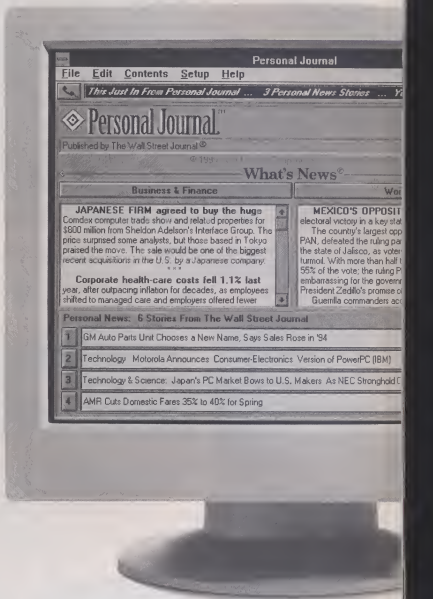

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Circle 278 on reader service card.

Prime Time 95

So, you didn't hear about the Windows 95 Preview Program until the deadline had passed? You have two options, then: Wait for the retail release later this year, or get creative.

If you work for a large company, someone in your organization is evaluating Windows 95 right now. Ask around. Take your favorite IS person to dinner at a four-star restaurant, and pick a *really* good wine. Whisper a few words in the right ears, and maybe you can turn your PC into a 32-bit guinea pig.

Don't let the beta label fool you. Once upon a time, in the days before the general media discovered the Pentium bug, this batch of code would have been more than good enough to ship as Version 1.0. If you've mastered all the intricacies of Windows 3.1, you'll probably be able to step around the bugs and you'll find enough usability improvements and new features to justify switching immediately.

Even if you have a strong conservative streak, you'll probably want to evaluate Windows 95—if only to prepare for the day when it comes preinstalled on every new PC you buy. It wouldn't hurt to insist that any new peripherals and applications you purchase work with Windows 95 as well.

At this early stage, there are two classes of computer users for whom Windows 95 isn't ready. One is the network administrator who has to support a systemwide application that crunches on mission-critical data. The other is the experienced but unsophisticated user who can't fall back on a decade's worth of PC experience to troubleshoot a bug in the operating system. There are plenty of books and technical-support alternatives for Windows 3.1, but until Windows 95 has the official backing of Microsoft and a broad array of third-party training tools, it's not quite ready for the mass market.

With the exceptions listed above duly noted, though, Windows 95 is ready for prime time. If you get started now, you will have an undeniable edge when the real thing arrives in the stores this fall.

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	Networking	Service & Support	Windows for Workgroups
		Ease of Installation	Windows 95 Preview
Performance	Ease of Installation	Multimedia	Windows 95 Preview
		Low Hardware Requirements	Windows 3.1
	Internet Support	Service & Support	OS/2, Version 3
		Flexibility	Windows 95 Preview
Networking	Compatibility	Service & Support	Windows for Workgroups
		Scalability	Windows NT 3.5
	NetWare Support	Internet Support	Windows 95 Preview
		Ease of Installation	Windows 95 Preview

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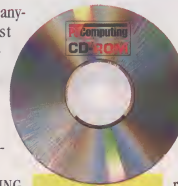

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Crossroads

V.34 vs. ISDN: What's the

BY MATTHEW LAKE

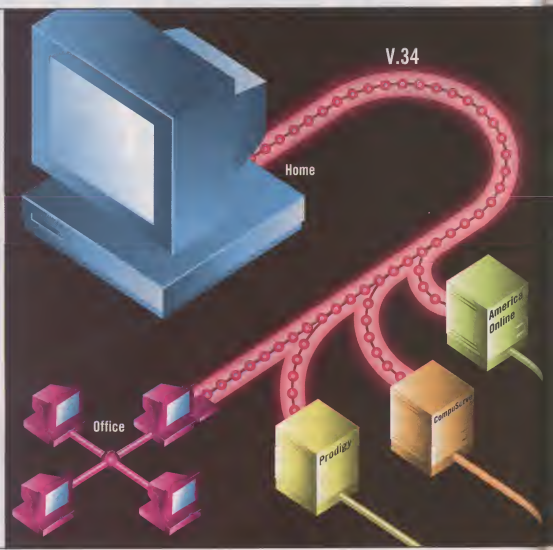
V.34: Using inexpensive modems equipped with the latest transmission protocol, this data-transfer mode operates at up to 28.8Kbps over regular phone lines. It has robust error correction to compensate for noisy lines and bad connections.

Pros

- Modems are inexpensive and readily available.
- V.34 provides the fastest transfer possible over regular phone lines.
- Current communications software packages support V.34.

Cons

- It communicates at half the speed of ISDN-based systems.



Verdict

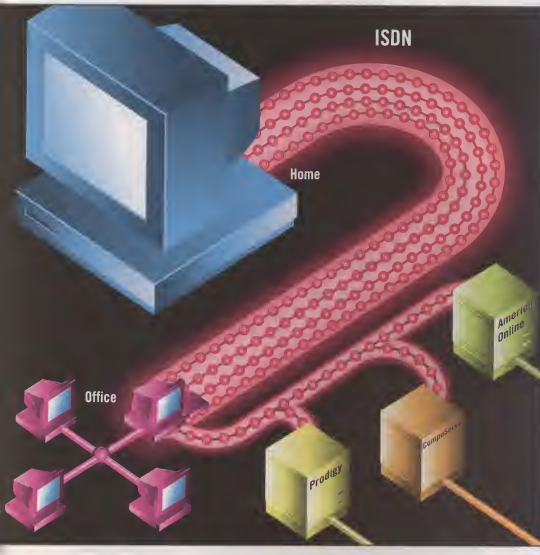
ISDN Will Be Worth It: On regular phone lines, V.34's 28.8Kbps is as fast as you can go with today's technology and for the foreseeable future. For dial-in telecommuting and Internet access, however, it's not nearly fast enough. ISDN's 128Kbps network access will ultimately win out, despite the current headaches and expense of installing an ISDN line into your home or business. Expect V.34 to thrive for a few more years until the phone companies get their ISDN act together. Then it will be easy to switch.

The Buzz

Not Exactly Widespread: It doesn't help if most of the Nynex and Pacific Bell regions have access to ISDN when you need to communicate with sites served by other phone companies that don't. By this time next year, only a quarter of phone companies will be ISDN-ready. ISDN transfers are still twice the speed of V.34 transfers, but ISDN eats into the price-performance payback rather severely. Still, Pioneering Internet-heads and telecommuters who live by fast access deem even 56Kbps worth the $30-per-month base rate for an ISDN line, when V.34 manages only 28.8Kbps over regular phone lines.

Best On-Ramp to Cyberspace?

ILLUSTRATION BY TIMOTHY EDWARD DOWNS



ISDN: The integrated services digital network system transfers information at rates between 64Kbps and 128Kbps. It requires special wideband phone lines, digital modems, and NT1 terminal adapters.

Pros

- ISDN transmits data at rates up to four times faster than regular phone lines.

Cons

- It's very difficult to install and configure.
- Digital modems and NT1 converters are expensive, and ISDN service costs several times more than regular phone service.
- ISDN isn't available on demand in many areas—even big cities.
- It's overkill for commercial services, whose access times currently top out at 14.4Kbps or 28.8Kbps.

Timetable

Is It Here Yet? The majority of people in the United States won't even be able to get ISDN installed until the end of this year. It's a limitation of the phone companies. And even when the trailing phone networks are able to provide most of their customers with an ISDN line, it will take another year before the demand lowers the price sufficiently to make it worthwhile to install a higher-priced line (currently five times the cost of installing a regular line—up to $500 in some areas) and paying the higher monthly service charges.

Opinions

With V.34, you have to deal with only one vendor—the modem manufacturer. With ISDN, it's at least three—the modem maker, the terminal adapter maker, and the phone company. V.34 communication is a lot less hassle.

SHYAMALA REDDY
CONTRIBUTING EDITOR

If you can get an ISDN line into your home—and if you can afford it—it's far and away the fastest way to go. Web surfing at 28.8Kbps for any length of time just isn't fast enough.

SCOT FINNIE
EXECUTIVE EDITOR
ZIFF-DAVIS INTERACTIVE

Help: Working Smarter

Care and Feeding of Your Hard Disk

Hard disks are like people. They can be healthy or ailing, and their longevity depends, in part, on preventive medicine. With a little time and attention, a good hard disk will chug on for years, faithfully recording your data and retrieving it for you. But as with the human body, years of neglect can have a debilitating effect. To get the most from a hard disk, you must take care to nurture it from time to time. Setting it up right is important, too; proper care and feeding begins the day you bring it home.

Proper maintenance doesn't require a lot of effort, just an awareness up front and a few minutes of your time here and there. Following is a rundown of what you need to know to keep your hard disk healthy, and how you can head off problems before they occur.

Bigger Isn't Always Better That new PC you ordered has just arrived. You flip on the switch and it hums to life, hard disk already formatted and outfitted with DOS and Windows. It probably also has a few "freebie" applications the manufacturer has seen fit to bundle with the system. Your C: drive now has more than 500MB of free space, which should be enough to satisfy even the most bloated of Windows apps. You're ready to roll, right?

Wrong. Before a hard disk is formatted, it must be partitioned. Partitioning, which is normally performed with DOS's FDISK command, divides a hard disk into one or more logical drives. Most hardware manufacturers partition a hard disk as one big logical drive to save you the trouble of partitioning it yourself. But the time and effort the vendor supposedly saves you may, in fact, mean a waste of your hard disk's precious space. The larger the logical drive, the less efficient it is at handling small files. A file just *one byte* in size occupies 2K on a 100MB drive. The same file consumes 16K on a 540MB drive. It pays to repartition a large hard disk into smaller units if you'll be storing lots of small files.

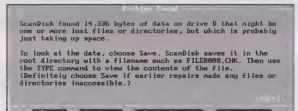
The table in "Cluster-Size Math," page 196, details the minimum amount of disk space that a file can claim vs. partition size. The cluster size is set with the FORMAT command, and it's based on the partition size; you have no control over it other than by setting the partition size prior to formatting. Unpartitioned, a hard disk containing slightly more than 1GB of storage space (not uncommon these days) uses a whopping 32K of disk space for even the smallest of files.

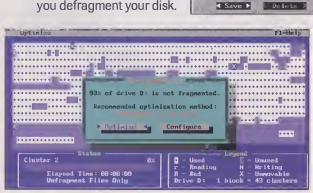
There's no hard-and-fast rule dictating the optimum partition size because this depends on the sizes of the files stored on the disk. But a good rule of thumb is to keep partition sizes to less than 256MB if you'll be storing primarily small files, or 512MB if you'll be storing lots of large files, too.

Reclaim Space You can repartition a hard disk with FDISK, but repartitioning destroys what's already there. So back up your files first—or, if your hard disk contains nothing but the programs that were preinstalled on it, be prepared to reinstall them. Have a bootable floppy disk on hand before repartitioning so you can reinstall DOS. Before exiting FDISK, use the "Set active partition" menu option to mark the C: drive as the bootable partition so DOS

SNAPSHOT SCANDISK AND DEFRAG: LIFESAVING UTILITIES

Ghost Files: ScanDisk found 14K of lost clusters on this disk. This data once belonged to files but has become separated from them. It now occupies space needlessly, which spells trouble. Run ScanDisk before you defragment your disk.





Wise Optimize: MS-DOS's DEFRAG command fights disk fragmentation by reorganizing the files on your hard disk. A fully optimized disk runs slightly faster, but a files-only optimization requires less time to complete. DEFRAG will recommend which form of optimization you need.

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can boot from it. And remember to format each of the partitions you create. The active partition is the boot drive, so be sure to format it with the /S parameter, which installs the necessary system files on it. DOS will frequently use a partition even if it wasn't formatted with the FORMAT command, but this is sure to cause problems down the road.

Defragging DOS is a very efficient bookkeeper. One of its jobs is to track where files are stored on a hard disk. If you write a 1MB file to disk and there are lots of 4K clusters free, DOS will divide up the file among the available clusters, even if those clusters are scattered about the disk. Over time, files tend to become heavily fragmented, which slows down reads and writes by increasing the distance the drive heads must travel. You may not notice this slowdown at first because it occurs gradually, but with time even the fastest hard disk grows sluggish, with the potential risk of increasing data loss and painful crashes.

The solution: Defragment your hard disk at regular intervals. MS-DOS 6.0 comes with a defragging utility (called DEFRAG), as do most popular disk utility packages. Third-party and shareware defraggers are also available.

There are various defragging methods to choose from. A full optimization—one that moves all files to the beginning of the disk and stores them in contiguous sectors—could take a half hour or more, depending on the PC's speed, the hard disk's size, and the fragmentation level. A files-only optimization, which places files only in contiguous areas, is faster, but also slightly less effective. Most defragging utilities will analyze your disk and recommend which form of optimization to use. Defragment your hard disk every couple of months and you'll retain peak performance.

Repairing Disk Errors Before you defragment a disk, you should look for errors in the file-tracking structures that DOS places on it. If you use MS-DOS 6.2, use the ScanDisk command; if you use an earlier version, use CHKDSK. Both recognize about 30 different types of errors, ranging from lost clusters (clusters of storage space marked as in use but not currently associated with any file) to cross-linked files (files that erroneously share disk sectors). Either one will repair errors, but repairing often means losing the files affected by the errors. You really shouldn't run a defragger until after your disk gets a clean bill of health from ScanDisk, CHKDSK, or a third-party equivalent, because the defragmentation will result in data loss. Fortunately, most defraggers will warn you of possible errors and prompt you to repair them first.

Unlike CHKDSK, ScanDisk will optionally perform a low-level surface scan on your drive to test each sector's capability to store and retain data. While useful, this feature sometimes lets errors go undetected. The basic problem is that the hard disk automatically retries a disk access several times if the first attempt fails. A sector that requires several attempts to read or

EXPERT TIPS HARD DISK DOS AND DON'TS

Do repartition a large hard disk into smaller and more manageable logical drives if you'll be storing lots of small files on it.

Don't forget to format each drive after repartitioning, or to mark drive C: as the active partition. And back up your files before running FDISK!

Do create subdirectories for your programs and data files.

Don't store too many files or directories in the root directory. On most hard disks, the root directory is limited to 512 files or directories, so you can get "disk full" errors even when there are hundreds of megabytes of free space remaining.

Do defragment your hard disk with DEFRAG or a third-party disk optimizer. The more work you do, the more often you should defrag.

Don't run a defragger until your disk receives a clean bill of health from CHKDSK, ScanDisk, or a third-party equivalent. And don't defrag inside a multitasking environment such as Windows, OS/2, or Desqview.

Do run your PC's CMOS configuration program and copy down the drive type number. Then store that number in a safe place.

Don't move your PC while it's turned on. A hard disk spins continually, and although today's hard disks are rugged enough to accept several G's of acceleration, the wrong bump at the wrong time could cause physical damage to the disk's magnetic coating.

Do reduce clutter by periodically deleting (or archiving) unnecessary files. Use RDEL to make a clean sweep of all files of a given type.

Don't count on ScanDisk's surface scan option to detect impending disk errors. If you're concerned about physical defects that develop over time (it happens), use Gibson Research's SpinRite or a similar utility to spot and correct errors before they cause irreversible problems.

Do run ScanDisk if DOS complains about a damaged compressed volume file (CVF) on drives compressed with DoubleSpace or DriveSpace. ScanDisk can repair many types of errors in the CVF and avert data loss.

FYI CLUSTER-SIZE MATH

Get More Space: When formatting a disk, DOS's FORMAT command uses the partition size to determine what cluster size to use. Small files occupy less disk space on smaller partitions than they do on larger partitions. Before you partition your hard disk, refer to the table below for important cluster size information. (Note: DOS supports up to 2GB.)

Partition Size	Cluster Size
16MB to 128MB	2K
128MB to 256MB	4K
256MB to 512MB	8K
512MB to 1GB	16K
1GB to 2GB	32K

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Circle 111 on reader service card.

SUPERSCRIPT DISKWIDE FILE DELETIONS

Create a text file named RDEL.SCR and enter this DEBUG script. Type DEBUG <RDEL.SCR to create RDEL.COM. Or save yourself some typing and download RDEL.ZIP from PC Contact's data library 6, Tips & Macros. See page 298 for information about PC Contact.

```
N RDEL.COM
E 0100 EB 2F 44 72 69 76 65 2C
E 0108 20 70 61 74 68 2C 20 6F
E 0110 72 20 66 69 6C 65 20 6E
E 0118 61 6D 65 20 69 6E 76 61
E 0120 6C 69 64 24 2A 2E 2A 00
E 0128 2E 2E 00 5C 00 00 00 00
E 0130 00 B4 19 CD 21 50 B4 47
E 0138 32 D2 BE 6A 02 CD 21 FC
E 0140 BE 81 00 80 3C 20 75 03
E 0148 46 EB F8 80 3C 0D 74 1D
E 0150 80 7C 01 3A 75 23 B4 0E
E 0158 8A 14 80 E2 DF 80 EA 41
E 0160 CD 21 83 C6 02 B4 19 CD
E 0168 21 3A C2 74 0C B4 09 BA
E 0170 02 01 CD 21 B8 01 4C CD
E 0178 21 8B FE AC 3C 0D 74 0E
E 0180 3C 5C 75 F7 89 36 2F 01
E 0188 FF 0E 2F 01 EB ED C6 44
E 0190 FF 00 83 3E 2F 01 00 75
E 0198 06 89 3E 2D 01 EB 2E 39
E 01A0 3E 2F 01 75 11 89 3E 2D
E 01A8 01 FF 06 2D 01 B4 3B BA
E 01B0 2B 01 CD 21 EB 17 8B 36
E 01B8 2F 01 C6 04 00 89 36 2D
E 01C0 01 FF 06 2D 01 B4 3B 8B
E 01C8 D7 CD 21 72 0D 8B 36 2D
E 01D0 01 AC 3C 20 74 FB 3C 00
E 01D8 75 0E B4 0E 5A CD 21 B4
E 01E0 3B BA 69 02 CD 21 EB 85
E 01E8 E8 11 00 B4 0E 5A CD 21
E 01F0 B4 3B BA 69 02 CD 21 B8
E 01F8 00 4C CD 21 55 B4 2F CD
E 0200 21 53 06 83 EC 2B 8B EC
E 0208 B4 1A 8B D5 CD 21 B4 4E
E 0210 33 C9 8B 16 2D 01 CD 21
E 0218 72 0F B4 41 8B D5 83 C2
E 0220 1E CD 21 B4 4F CD 21 73
E 0228 F1 B4 4E B9 17 00 BA 24
E 0230 01 CD 21 72 25 80 7E 1E
E 0238 2E 74 19 F6 46 15 10 74
E 0240 13 B4 3B 8B D5 83 C2 1E
E 0248 CD 21 E8 AF FF B4 3B BA
E 0250 28 01 CD 21 B4 4F CD 21
E 0258 73 DB 83 C4 2B B4 1A 8C
E 0260 DB 1F 5A CD 21 8E DB 5D
E 0268 C3 5C
RCX
16A
W
Q
```

write is a sure sign of impending trouble. Unfortunately, ScanDisk has no idea whether it took one or ten attempts. To be absolutely safe, you should use a third-party product such as Gibson Research's SpinRite, which performs a thorough surface scan and fixes errors before they bite you. If SpinRite saves just one critical file, then it was worth the purchase price. Another excellent choice is the Norton Disk Doctor, available with the Norton Utilities.

If a sector containing file data goes bad, DOS will report a "data error" when you attempt to read that file. DOS's little-used RECOVER command, which unfortunately was removed from MS-DOS 6.0 because of its potential for misuse, can help out by removing the offending cluster from the file. The bad news is that you'll lose the data in that cluster, but the good news is that you'll get back the remainder of the file intact. If the SETVER device driver is loaded in your CONFIG.SYS file, you can use RECOVER from an older version of DOS. The command

```
RECOVER BUDGET95.XLS
```

restores the parts of BUDGET95.XLS that are stored in good sectors. Don't ever run RECOVER without specifying a file name; typing RECOVER C: will wipe out everything on that drive.

Discarding Unneeded Files It's tempting to treat a hard disk as an infinite resource, but even today's 1GB monsters can fill up quickly. Common sense says you should periodically delete no-longer-needed files from your drive, or offload them to a floppy or tape backup system for storage. But many users—especially novices—fail to do this. Get used to using PKZIP to compress and transfer to floppy disks the files that you don't need often, but are not ready to discard altogether.

Some Windows applications create huge temporary files that you don't even know about and that don't go away by themselves. For example, Microsoft's Visual C++ 2.0 may leave behind several megabytes of PDB and PCH files when you compile a 30K program: Compile several programs, each in its own directory, and 50MB of disk space can disappear just like that. The solution? Use the DEBUG script listed in "Diskwide File Deletions," at left, to create an RDEL utility, which works like the DEL command but operates in the current or specified directory and its descendants. The command

```
RDEL *.PCH
```

deletes PCH files from the current directory and its subdirectories. The command

```
RDEL \*.PCH
```

deletes PCH files diskwide, starting at the root directory level and working down through every subdirectory. RDEL is great for getting rid of TMP files, BAK files, and any other type of file that you want to remove from a range of directories.

A little time and attention is all it takes. Take care to keep your hard disk in good working order and, barring mechanical malfunctions, you'll be rewarded with years of faithful service.

Norton Utilities / $120 est. street / Symantec / (800) 441-7234 / *Reader Service No. 742*
SpinRite / $89 est. street / Gibson Research / (800) 736-0637 / *Reader Service No. 743*

JEFF PROSISE *is a contributing editor to* PC Computing *and the author of* DOS 6 Techniques & Utilities, *ZD Press, 1993.*

INTERNET COMPRESSION

WinZip 5.6

Best known for bringing the convenience of drag-and-drop to PKZIP files, WinZip now makes it easy to work with the TAR, gzip, and Unix compressed files often found on the Internet. You won't need any external programs to work with these file formats. (WinZip also supports ARJ, LZH, and ARC files, but requires external programs to access these files.) Download WZ56.EXE from data library 0 (Windows Utilities) of PC Contact (see page 298 for downloading information), or call (800) 426-3475 to order a disk from Public Brand Software.

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CUSTOMIZE QUATTRO PRO 6.0 FOR WINDOWS

The Taming of the Spreadsheet Pro

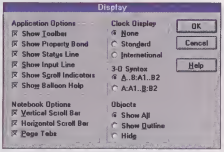
Data for Lunch "Crunch, crunch." In the early days of DOS spreadsheets, you could almost hear the programs churning through rows and columns of data—calculating and spitting out results in short order. That was back when the only people who had much use for spreadsheets were accountants and stockbrokers.

Today's spreadsheets do a lot more than their predecessors. They're also quite a bit more sophisticated, which, in reality, means more complexity. But it's hard to beat Quattro Pro for sheer ease-of-use. And you can easily adapt it to your work habits via luxuries such as style sheets, boilerplate options, and desktop orientation saving.

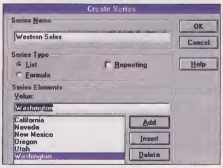
All Dressed Up When you're ready to distribute quarterly sales information, you don't want to rely on numbers alone. With a couple of easy mouse clicks, Quattro Pro can transform those boring black-and-white numbers into glorious charts filled with eye-popping colors. And with a few simple extra steps, you can create a dazzling presentation to wow the investors.

Do Some Digging Some of the hidden benefits to be unearthed in Quattro Pro go beyond raw data and numerical entries. Contact databases, phone numbers, and product specs can look spiffy. It's easy to organize your clutter with this spreadsheet. With a little creativity, you can make Quattro Pro work for you. KYLA K. CARLSON

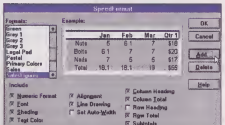
GUIDED TOUR MAKE QUATTRO PRO 6.0 WORK FOR YOU



Detailed Display: It's easy to put all the options you want—display, syntax, and objects—into one easily accessed dialog box. Click on View, Display to get your configuration options all in one place.

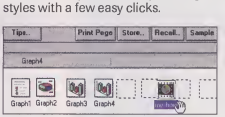


No-Frills Fills: Don't enter the same information over and over again—save a list and reuse it as a SpeedFill. Click on the SpeedFill icon, select Create, assign a Name, and type the list.

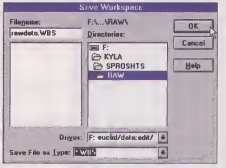


Frenzied Formats: SpeedFormatting is a godsend, but don't stop with the defaults. If you have formatting you want to save, select it, click the right mouse-button, and select SpeedFormat. Choose Add and name your format.

Go in Style: Not everyone knows that spreadsheets have style sheets, too. You can save your favorite formatting options as a style, just as you can in your word processor. Click on Notebook, Define Style to define new styles or modify existing styles with a few easy clicks.



Prompt Prints: With just a few simple steps, you can print all of your worksheet charts at once. From the objects page, click on Create Slide Show. Select Graph icons and drag them into your slide show, then just select File, Print.



Familiar Spaces: If you want to preserve onscreen file arrangement, you can save it as a workspace. Simply select File, Workspace, Save and type a filename. To return to a project, just select File, Workspace, Restore.

PRESENTING

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YOU'VE GOT THE RIGHT BUTTON

Teach Your Old Mouse Some New Tricks

The right mouse-button gets no respect. This is one of the handiest productivity tools in your arsenal, but still, many users insist on going through several menu and dialog-box layers instead of opting for the shorter route of right-clicking on an object to bring up its relevant menus. Two or three years ago, right-clicking was considered a novelty, and this functionality wasn't built into any of the mainstream applications (let alone operating systems). But many Windows applications shipping today take advantage of the right mouse-button in lots of innovative ways.

Just What You Need Most right-clicks have one thing in common: They bring up context-sensitive menus. Right-click on text (whether selected or not) in Word 6.0 for Windows, and you get a pop-up menu containing clipboard actions (Cut, Copy, Paste), and several formatting submenus (Font, Paragraph, and Bullets and Numbering). These six submenus reside in different pull-down menus on the menu bar, but the right-click consolidates and streamlines them.

Right-clicking may not save you keystrokes (for example, it takes only two clicks to get to the Font menu through the regular Format menu in Word, and just as many if you right-click on the text), but the advantage is that you don't have to pause and think where those menus are buried.

Right-click on a graphic in WordPerfect 6.1 for Windows (see "Rosy Opportunity," below) and the appropriate figure menu pops up. In Starfish Software's Dashboard 2.0, right-clicking on an icon reveals the name of the application that the icon launches, and double-right-clicking anywhere opens the configuration menu. Right-click on the Restore button in a maximized Microsoft Excel spreadsheet, and you get a worksheet-specific menu: save, print, spelling check, and so on (normally available within the File and Tools pull-down menus).

Because this trend is relatively new, you can expect a few usability "gotchas." For example, right-click on a selection of cells in a Word table, and you'll get a table-specific pop-up menu. But if you want to merge those cells into one, you need to go to the Table pull-down menu, because the merge option is not available in the pop-up menu.

Right Infrastructure Unfortunately, Windows 3.1 itself doesn't support right-clicking, but some third-party add-ons, such as Central Point's PC Tools 9.0 and even Quarterdeck's Sidebar add that capability by replacing the Windows interface. However, that functionality doesn't carry over to applications. Luckily, IBM's OS/2 Warp 3.0 and the soon-to-ship Windows 95 from Microsoft support right-clicking extensively, which means that all their native apps will follow suit.

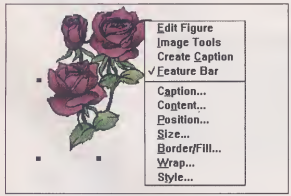
How do you know if your applications support right-clicking? Don't bother searching the manuals. The best thing you can do is to keep right-clicking on objects and areas on the screen—you're bound to discover a few buried treasures. YAEL LI-RON

PC Tools / $120 est. street price / Central Point / (800) 441-7234 / *Reader Service No. 744*

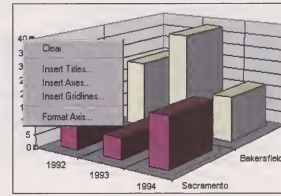
Sidebar / $35 est. street price / Quarterdeck / (800) 354-4757 / *Reader Service No. 745*

SNAPSHOT

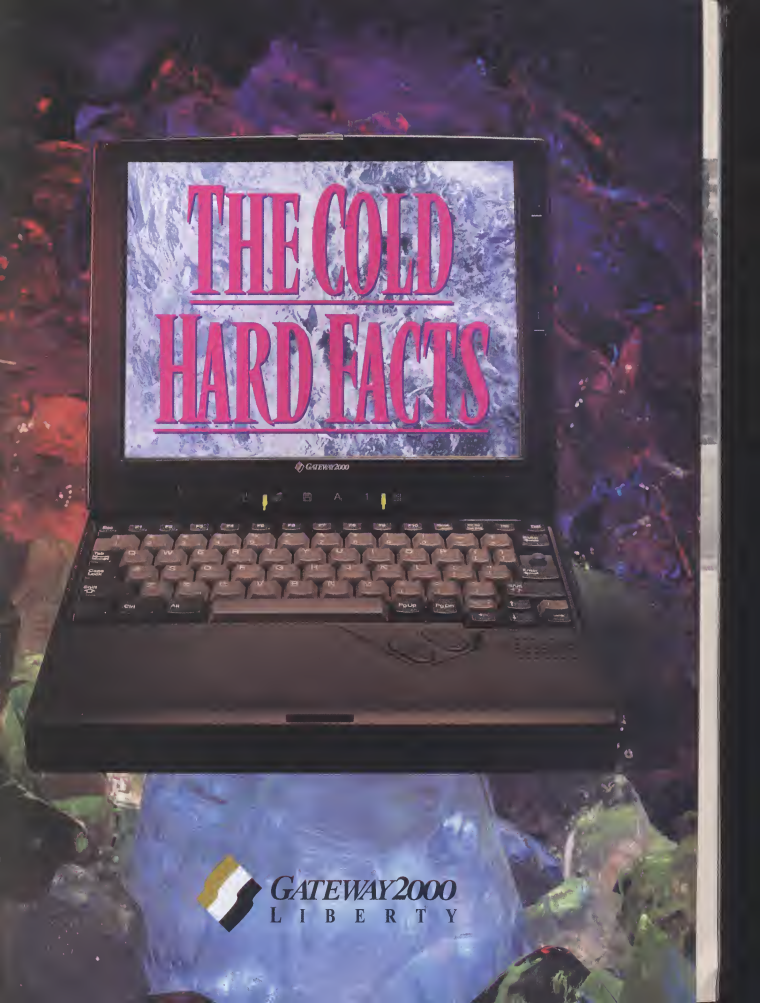
CONTEXT-SENSITIVE **POP-UP MENUS** REPLACE STANDARD PULL-DOWN MENUS



Rosy Opportunity: Right-click on a WordPerfect graphic to get a pop-up menu with all the tools you'll need to edit it. The options would otherwise be buried under several levels of pull-down menus.



Reads Your Mind: In Excel 5.0, when you right-click on any part of an active chart—series, legends, grid, axes, and so on—the appropriate onscreen menu offers the most relevant functions.


THE COLD HARD FACTS
GATEWAY2000
GATEWAY2000
LIBERTY

F1
F2
F3
F10
Pause
Break
Prt Sc
Sys Req
Ins
Del
BkSp
Enter
Shift
PgUp
PgDn
intel
inside

CLEAR-CUT ANSWERS

Your choice of a portable PC may not seem like a crystal clear decision at first. There are about a gazillion portables to choose from. Want some clear-cut answers to what's right for you?

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You'll need a 486DX2 processor at the very minimum. We strongly recommend a DX4. Spreadsheets, graphics and word processing all run better and faster with the DX4 processor. All Gateway 2000 portable PCs include a DX2 or DX4 processor.

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Cache is great — that is when you can find it on a portable — because it gives you a superior performance. Our Liberty DX4-100 includes 256K L2 cache on an accelerated local bus yielding Pentium™-like performance. The ColorBook² includes 512K video cache for great video performance.

Hard Drive

Nothing less than a removable 340MB hard drive will do. In fact, you'll want the largest hard drive you can get. Microsoft® Windows,™ DOS® and standard software applications automatically consume around 140MB at the time of purchase. All Liberty and ColorBook² PCs include at least a 340MB removable hard drive. The Liberty DX4-100 Best Buy and ColorBook² DX4-100 Best Buy both include a 720MB removable hard drive.

RAM (Random Access Memory)

A bare *minimum* of 8MB RAM is best — 4MB wasn't enough last year. To run Windows (*and* Windows 95) you'll need 8MB. 8MB will also increase your battery life and improve system performance. All Liberty and ColorBook² systems come standard with 8MB RAM and are expandable to 20MB or 24MB RAM.

Screen

When you're talking portables, you want the biggest, clearest display possible without adding weight or hiking up the price.

A good way to judge screens is to divide the screen size of the portable by its weight. The higher the ratio the better. The Liberty has an incomparable screen size-to-weight ratio of 2.44. This 10.4-inch screen also gives you 23 percent more active viewing area than a 9.4-inch screen and 53 percent more than an 8.4-inch screen.

The Liberty's 10.4-inch and ColorBook²'s 10.3-inch screens give you the best value available in a color display. With vivid colors and bright, clear screens, you'll forget you're working on a portable PC.

Size and Weight

It's a portable PC — the smaller and the less it weighs, the better! The Liberty and ColorBook² emerge favorably in both areas.

Batteries

Look for between three and four hours of battery life depending on the processor and RAM. Batteries based on nickel metal-hydride (NiMH) or lithium ion will give you the best performance. The Liberty gives you up to four hours or more with power management. And it also allows for upgrading to a lithium ion battery.

Software

The better the included software applications, the more the value of your portable PC increases. Pre-installed on all Gateway portables is Microsoft Works for Windows 3.0 or MS Office Professional 4.3. The OAG® FlightDisk® and World Clock software is also included on all Gateway portables.

Keyboard & Pointing Device

You'll need a keyboard that's comfortable for you and that's also easy to use. The Liberty is equipped with a large palm rest, and flip-out feet so you can adjust the keyboard angle.

Pointing devices vary greatly. Again, find one that's easy for you to work with. Gateway's EZ Point™ integrated pointer is uniquely positioned to be comfortable and easily accessible.

Infrared Technology (IR)

Extras such as the Liberty's IR technology add even more value to your portable PC. With it you can take advantage of wireless file transfer — this means transferring files between the Liberty and your desktop (or between two Liberty PCs) without cables!

Service

You'll want to make sure you have the right support for your portable PC. When you buy from Gateway 2000, you have dedicated portables technical support for the life of your Gateway system. These technicians are trained to specifically handle all your portable questions and concerns. We also offer a special VIP warranty.

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ABANDON HOPE ALL YE WHO ENTER—PLUMBING THE DEPTHS OF DDE HELL

Linking Word and Organizer Together, Kinda

Naething is got without pains but an ill name and lang nails—Scottish Proverb. Oh, if we had only known the pains of this'n *before* we started! It all began innocently enough when Tim Longacre posted a message on CompuServe's GO WOPR tech support forum. Tim wanted to be able to use a little three-step Word for Windows macro that would work something like this: First, double-click on a person's name, then click on a "Lookup" Toolbar button. Finally, have Word for Windows go out to Lotus Organizer, retrieve the address, and stick it in the current document.

Not much to it, eh?

After wrestling with this hellish ogre for a while, we think it will be easier to balance the federal budget *and* place a human colony on Mars. Simultaneously.

DDE Interlude All right. Off the soapbox. Let's back up for a second and take a look at the tools we Windows types have at hand to tie applications together.

The lowest level of Windows application interconnection is the Clipboard, which works pretty well with most apps.

Here's how to insert an address from Organizer into a Word document, using the clipboard. Inside the document, put your cursor where you want the address, and make sure you know which name you want to retrieve. Minimize Word for Windows. Bring up Organizer and flip to the Address Book section. If you know the last name, click on the appropriate letter and page through the Address Book until you find it. (If you don't know the full name, click on the Flashlight or hit F3, type the search characters, click on Find All, then flip through the "found" names, (see "A Dialog between Word and Organizer," at right). Once you've found the name, click on the Copy button, switch to Organizer, and paste.

Quite different from Tim's simple three-step macro, no? The Windows clipboard is a buggy-whip solution in a Maserati (or at least a Yugo) environment.

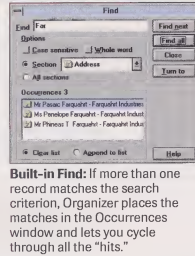
At the high end of the Windows app interconnection scheme of things lies OLE, Object Linking and Embedding. While OLE is great (sometimes), if and when it works (see *The Underground Guide to MS Office, OLE, and VBA*, by Lee Hudspeth and T. J. Lee, Addison-Wesley, 1995), these links are still just a gleam in some interface designer's eye. Some day you'll be able to stick an Organizer Address Lookup object in your Word business letter template, but don't expect anything useful anytime soon. Check back again next millennium.

That leaves us with Dynamic Data Exchange, or DDE. If you've been following our column in *PC Computing* for the past year or so, you've seen DDE in action a few times. The basic DDE Request shtick—the one that permits one Windows application to gather data from another Windows app—goes like this:

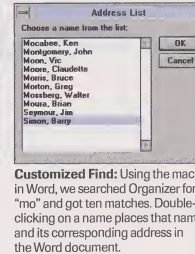
The application that needs information, which is called a Client (in this case, Word for Windows), tries to set up a DDE conversation while the app providing the information, called a Server (in this case Organizer), is running. It's like dialing the phone: The Client dials the Server's phone number. If the Server doesn't answer within a set amount of time (it may not be running, or it may be busy), the Client gives up. If the phone call goes through and the DDE link is established, the Client establishes a Topic of conversation. (Typically, the Topic is a filename—the name of the Organizer database containing the needed names and addresses, for example.) Then the Client starts asking for information. "Give me the first and last names from all of the records that contain the name Farquahrt," or "What is the mailing address of Phineas T. Farquahrt?" Finally, the Client severs the DDE connection.

At least, that's how it's *supposed* to work. In reality, each Windows application implements DDE a little bit differently. Even Microsoft handles it in different ways in its two big DDE programs, Excel and Word for Windows. So some variation in DDE dialects is expected. But somebody at Lotus must have decided that variety is the spice of software: Organizer takes a mighty *creative* approach to Dynamic Data Exchange.

SNAPSHOT A DIALOG BETWEEN WORD AND ORGANIZER



Built-in Find: If more than one record matches the search criterion, Organizer places the matches in the Occurrences window and lets you cycle through all the "hits."



Customized Find: Using the macro in Word, we searched Organizer for "mo" and got ten matches. Double-clicking on a name places that name and its corresponding address in the Word document.

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When we started this little exercise, we expected that Tim's three-step macro would translate into something like this:

1. Word calls (or, in DDE lingo "initiates a conversation with") Organizer.

2. Word asks Organizer for a list of all names that match the search criterion.

3. If there's more than one match, Word presents the list of matching names to the user, and asks the user to choose one.

4. Word goes back to Organizer and asks for the address associated with the name. Organizer sends the address to Word, and Word sticks it into the document.

5. Word terminates the conversation.

Nice, short, and sweet. But *oy vey!* The reality is far off the mark. We went through all the documentation we could find on Organizer and DDE. We talked to the tech support folks—very friendly, very responsive—but they didn't have the information we needed. The few Organizer DDE commands that are documented don't seem to be documented correctly; and none of the obvious DDE commands seem to be available. (Or if they *are* available, we couldn't find them . . . and believe me, we tried every trick in the book!)

Lotus doesn't seem to feel that this information is very interesting to users, or commercial or corporate developers. If you disagree, you might drop a line on the Lotus BBS at (617) 693-7000 (settings 8N1), or the Lotus forum on CompuServe (GO LOTUS). They'll know who sent ya. Heh, heh, heh.

As best we can tell, Organizer has a very odd implementation of the DDERequest command. Instead of using DDERequest, the Lotus way of doing things requires us to DDEExecute something—to use DDE to make Organizer run a command—and then check the "return code" after running the command to see what happened.

Organizer is incapable of answering the most fundamental questions via DDE. We started with the DDE request we wanted the most: "Give me the first and last names from all of the records that contain the name Farquahrt." After a lot of frustration, we discovered that Organizer couldn't deliver the list. OK, we're flexible. If we can't do it, we'll just build the list, one name at a time, in Word for Windows. "Organizer, just give me the first and last name from any record that contains the word Farquahrt." Organizer couldn't do that, either.

To make a long story short, we couldn't uncover any way to find out how many records contained the word "Farquahrt," or what those records might be. In fact, we couldn't even find a command to tell us how many records were in the address book!

So there we were in the seventh ring of DDE hell, Sisyphus sighing at every downward slip, half expecting a Doom II Mancubus to pop up in response to one of our miscreant DDE calls, reducing Word to a mass of bloody gore. The only thing

SUPERSCRIPT THE LOOKER MACRO

To type this macro, go into Word 6.0 for Windows, select Tools, Macro, type LookerLotusOrganizer, and click on Create.

```
Dim Shared MatchedName$(500), MatchedAddress$(500), nMatches
Dim Shared chan, FindFirst$, FindNext$, DQ$, Title$
Sub MAIN
   Title$ = "LOoker for Lotus Organizer"
   DQ$ = Chr$(34)
   If Len(Selection$()) > 1 Then
         MatchPattern$ = Selection$()
   Else
         On Error Goto Bye
         MatchPattern$ = InputBox$("Search for", Title$)
         On Error Goto 0
   End If
   Print "Establishing DDE Connection with Organizer"
   If Not InitiateDDEConnection Then Goto Bye
   Print "Searching the Organizer database for " + MatchPattern$
   FindMatchingOrganizerEntries(MatchPattern$)
   Print ""
   Select Case nMatches
   Case 0
         Msg$ = "No matches found for: " + MatchPattern$
         MsgBox Msg$, Title$
   Case 1
         InsertAddress(0)
   Case Else
         Begin Dialog UserDialog 386, 198, Title$
               Text 10, 6, 196, 13, "Choose a name:"
               ListBox 10, 25, 262, 162, MatchedName$(), .n
               OKButton 285, 24, 88, 21
               CancelButton 285, 48, 88, 21
         End Dialog
         Dim dlg As UserDialog
         On Error Goto Bye
         Dialog dlg
         On Error Goto 0
         InsertAddress(dlg.n)
   End Select
Bye:
   If chan <> 0 Then DDETerminate chan
End Sub
   Function InitiateDDEConnection
   On Error Goto Badlink
   chan = DDEInitiate("ORGANIZE200", "System")
   s$ = DDERequest$(chan, "Topics")
   DDETerminate chan
   idx = InStr(s$, Chr$(9))
   If idx = 0 Then Goto BadLink
```

continued on page 212

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SUPERSCRIPT MORE OF THE LOOKER MACRO

continued from page 210

```
  OrgFName$ = Mid$(s$, idx + 1, Len(s$) - idx)
  chan = DDEInitiate("ORGANIZE200", OrgFName$)
  InitiateDDEConnection = - 1
  Goto Bye
BadLink:
  Msg$ = "Organizer must be running, and a file must "
  Msg$ = Msg$ + "be open, for LOoker to work."
  MsgBox Msg$, title$, 16
  InitiateDDEConnection = 0
Bye:
End Function
Sub FindMatchingOrganizerEntries(Pattern$)
  nMatches = 0
  AddrBook$ = "[SelectSection(" + DQ$ + "Address" + DQ$ + ")]"
  IndexLName$ = "[SelectIndex(" + DQ$ + "LastName" + DQ$ + ")]"
  DDEExecute chan, AddrBook$
  DDEExecute chan, IndexLName$
  FindFirst$ = "[Find(" + DQ$ + "<FIRST>" + DQ$ + ")]"
  FindNext$ = "[Find(" + DQ$ + "<NEXT>" + DQ$ + ")]"
  AddressFormat$ = "FORMAT(" + DQ$ + "Business" + DQ$ + ")"
  DDEExecute chan, FindFirst$
  completion = Val(DDERequest$(chan, "RESULT"))
  While completion <> - 1
      idx = idx + 1
      First$ = DDERequest$(chan, "FirstName")
      Last$ = DDERequest$(chan, "LastName")
      Address$ = DDERequest$(chan, AddressFormat$)
      If InStr(First$, Pattern$) Or InStr(Last$, Pattern$) \
      Or InStr(Address$, Pattern$) Then
          MatchedName$(nMatches) = Last$ + ", " + First$
          MatchedAddress$(nMatches) = Address$
          nMatches = nMatches + 1
          If nMatches > 500 Then Goto TooMany
      End If
      DDEExecute chan, FindNext$
      completion = Val(DDERequest$(chan, "RESULT"))
  Wend
  Goto Bye
TooMany:
  MsgBox "More than 500 matches. Terminating.", Title$, 16
  Stop
Bye:
End Sub
Sub InsertAddress(idx)
  On Error Goto MustRunInADocument
  If Len(Selection$()) > 1 Then EditClear
  Insert MatchedAddress$(idx)
  Goto Bye
MustRunInADocument:
  Msg$ = "You tried to insert an address into a macro!"
  MsgBox Msg$, Title$, 16
Bye:
End Sub
```

we could find that worked consistently was "Read next record." Bummer.

One thing Organizer does right is to provide built-in formatting options: Once we finally found the right record, we could ask to get the data in a plethora of formats.

If you use Word 6.0 and Lotus Organizer 2.0, type our macro into Word, or, better yet, download LOOKER.ZIP from data library 6 (Tips & Macros) in the PC Contact forum (see page 298 for information).

LOoker for Lotus Organizer has all sorts of restrictions. Organizer must be up and running, with the proper file loaded. The search string is case-sensitive—if you ask for matches with "far" you won't find "Farquahrt." The program dies when confronted with more than 500 matches. It only works with Organizer's Business addresses. And you have to be careful not to select paragraph marks in the source Word document. But considering the hurdles we had to jump, we hope you think it's pretty cool in spite of the limitations.

Beyond Organizer The real irony here is that neither of us uses Lotus Organizer. Woody is a Metz Phones fan from way back. Unlike most PIMs, Metz Phones doesn't try to be all things to all people. It's an address book. That's it. Phones' inherent simplicity appeals to Woody's inherently simple mind. And it has an excellent DDE interface. Metz Phones is a $59 shareware product. Look for METZPH.ZIP, in PC Contact's data library 4 (Business Tools).

Although the LOoker macro for Metz Phones is a bit too long to list here, it's available online. If you download LOOKER.ZIP, you'll find a macro called LookerMETZPhones which—*mirabile dictu!*—provides all the functionality of LOoker for Lotus Organizer . . . with a fraction of the hassles.

Vince likes Polaris Software's PackRat 4.1, which provides a complete set of commands (so-called DLL calls) for every conceivable permutation of DDE-style interaction. While the approach technically isn't DDE, the end result is quite usable—and well documented. LOOKER.ZIP also includes a LOoker macro for PackRat. Check out the macro LookerPackRat41.

WOODY LEONHARD & VINCENT CHEN

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OUR TECHNICAL STAFF RESPONDS

Questions, Answers, and Tips

You want to get the most out of RAM disks and virtual memory, but you're not sure how. Or perhaps you tried to tidy up your fonts, but ended up with messy Windows menus. We address these and other issues about DOS, Windows, and hardware, and share tips and tricks that you can use in your favorite applications.

VIRTUAL RAM DISK

Question: *You once published a tip about setting up a RAM disk to boost system performance. Can I use a RAM disk for virtual memory?*

James Valdes-Pages
Pembroke Pines, Florida

Answer: Why would you want to? Your system uses virtual memory only when it runs out of RAM—remember that virtual memory is just an area on the hard disk pretending to be RAM. So if you create a RAM disk, you eat up some RAM. If you then tell Windows to use the RAM disk as virtual memory, you've come full circle: Your system has run out of RAM so it's trying to use virtual memory, which you've directed to RAM also. Worse, you'll run out of virtual memory really quickly because you'll run out of RAM really quickly.

RAM disks are useful, however, as a place to put temporary files: They're incredibly fast, and, since they're destroyed when you turn off your system, they don't leave temporary files littering your hard disk. All you have to do is create a RAM disk, then direct all your temporary file variables to it. First you need to set up a RAM drive by editing CONFIG.SYS and adding the following line:

```
DEVICE=C:\WINDOWS\RAMDRIVE.⊃
⊂SYS 1024 512 1024 /E
```

This line tells your system (when it reboots) to create a new disk drive letter (using the next available letter) on your system, except that "disk" will actually exist only in RAM. The disk will be 1MB (1,024 bytes) in size, it will have 512-byte blocks, and it will hold up to 1,024 files in its root directory. Oh, and it will be composed of extended memory.

Next, modify AUTOEXEC.BAT and add (or change) a line to point your temporary directory to the RAM drive. If RAMDRIVE.SYS creates the new drive letter D:, then you'd add something like this to AUTOEXEC.BAT:

```
SET TEMP=D:\
```

Restart your system and it will stick its temporary files on your faster RAM drive. SN

FONT ACCIDENT

Question: *I tried to save disk space by deleting most of my font files and keeping only the ones I use for word processing or graphics programs. Now my menus don't look right. What happened?*

Bob Konsowitz
Collierville, Tennessee

Answer: What happened is you blew away the fonts that Windows uses to display its menus. But don't worry, this isn't fatal: You can either reinstall them or just choose different fonts. Since using different fonts doesn't always work right, we'll show you how to reinstall the originals.

Under Windows, fonts are shared resources—when you install a word processor that installs fonts, these fonts should become available to every other Windows program. In fact, you can go into Windows' Control Panel (which is in the Main Windows group) and double-click on the Fonts icon to see the fonts currently installed on your system.

The font files that Windows uses to display drop-down menus are called System font files and reside on your disk with names like 8514SYS.FON, EGASYS.FON, and VGASYS.FON. The display resolution you've configured determines which file your system uses. These files contain many different fonts that

HOT TIP TYPE MULTIPLE FILES

Problem: DOS's TYPE command will print out only one file—it doesn't accept wildcards.

Solution: Try two simple batch files. With a text editor such as DOS EDIT, type the following:

```
@ECHO OFF
CLS
SET PMTBAK=%PROMPT%
FOR %%F IN (%1 %2 %3 ⊃
⊂%4 %5 %6 %7 %8 %9) ⊃
⊂DO CALL SHOW_.BAT %%F
GOTO END
```

Save that as SHOW.BAT, start a new batch file called SHOW_.BAT, and add the following lines:

```
@ECHO OFF
MORE < %1
PAUSE
CLS
```

If MORE doesn't work for you, use TYPE. To use these, type SHOW followed by a filename, several filenames, or a filename with a wildcard, for example: SHOW *.TXT, or SHOW READ.ME README.TXT.

RICHARD DAVIES MOORE, IDAHO

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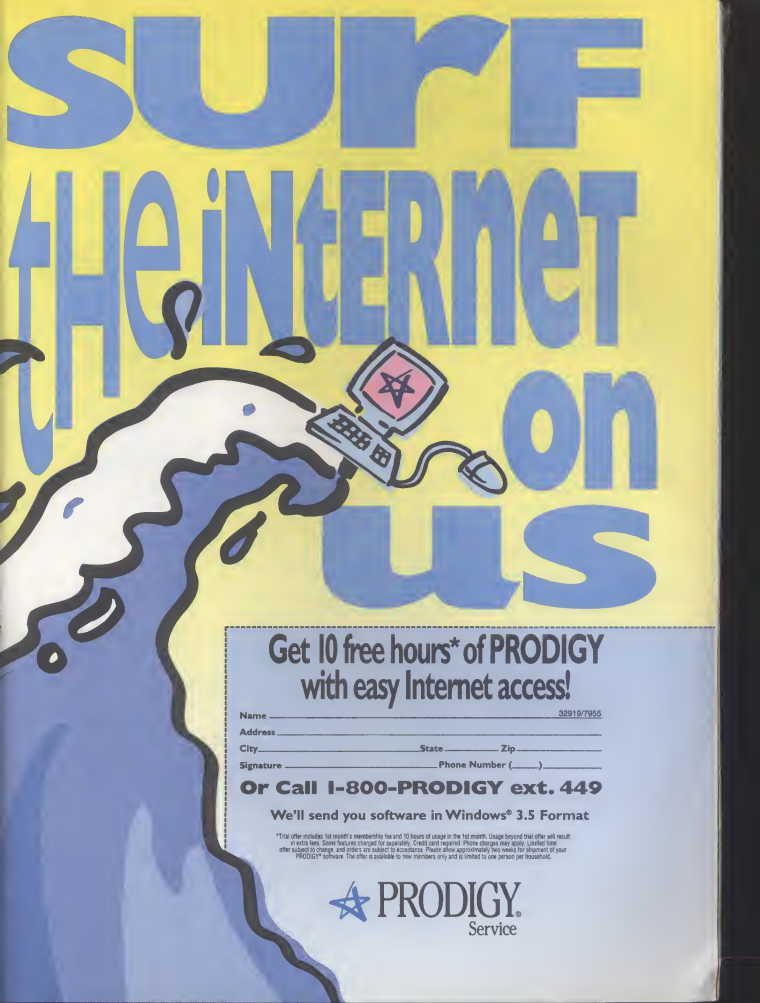

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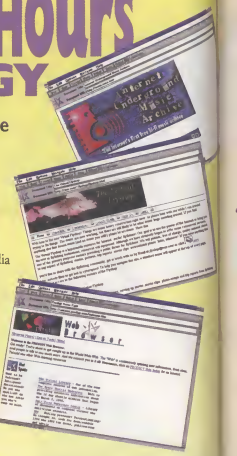

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will show up in the Control Panel with names like MS Serif, MS Sans Serif (which is the default for many dialog boxes and icon labels), and Courier.

If you removed one of these files, you can restore it. Dig around and find your Windows distribution floppy disks. Put disk number 2 into your floppy drive (assuming you're running Windows 3.1 and are using 3.5-inch floppies). This disk contains most of the fonts you probably need, except they're compressed. You'll need to figure out what resolution you're running Windows at—VGA (which is most likely), 8514, or EGA (not likely). Next, you're going to expand the compressed font file into a new directory:

```
\WINDOWS\SYSTEM\NEWFONT
```

You could just put them into

```
\WINDOWS\SYSTEM
```

but it's much easier to find the new fonts if you separate them from the crowd. To create the directory, open a DOS session and type at the prompt:

```
MD \WINDOWS\SYSTEM\NEWFONT
```

Let's say you're running VGA resolution—you'd type this:

```
EXPAND A:\VGASYS.FO_ ⊃
⊂C:\WINDOWS\SYSTEM\NEWFONT⊃
⊂\VGASYS.FON
```

The EXPAND utility will then tell you all sorts of useless information about how compressed the file was. You should probably restore VGAFIX.FON and VGAOEM.FON, too, just to get the rest of these fonts.

Next, you're ready to install the fonts. Run Windows' Control Panel, double-click on Fonts, and click on Add. Then, using the pull-down directory selection box, select \WINDOWS\SYSTEM\NEWFONT as a directory. The Font utility will read all the fonts out of that directory. Click on Select All, then click on OK. This will add these fonts back to your system. Restart Windows and your menus should look exactly like they used to, before you tried to save disk space. **YL**

STEP BY STEP CUSTOM AUTOFORMATS IN EXCEL

Beyond AutoFormat: You can format financial data in Microsoft Excel lightning-quick with the AutoFormat command. But sometimes none of Excel's 16 off-the-rack formats fits your needs exactly, so you have to add some extra formatting. One handy way to do this is to combine the best features of two AutoFormats.

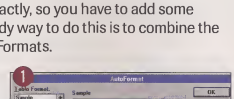
1. Format Once: AutoFormat with the template that looks most like what you want. To AutoFormat a rectangular block of cells, select that block and choose Format, AutoFormat. Select the format you want from the Table Format list. The Sample box will preview what AutoFormat will do. Click on OK.

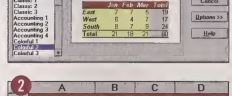
2. Not Quite: After you've run your first AutoFormat, check out the results and see what you'd like to change. The format we chose uses negative numbers, which aren't suitable for financial schedules.

3. Format Twice: To remedy this, reblock, choose Format, AutoFormat again. We selected the Accounting 3 AutoFormat which displays negative numbers in parentheses. Click on Options. To apply the number formatting only—and adjust the cell dimensions accordingly—deselect all options in the Formats to Apply section except Number and Width/Height. Choose OK.

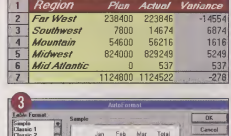
4. Object d'Art: The revised worksheet combines the color attributes of the Colorful 2 AutoFormat and the embedded commas and left-justified dollar signs of the Accounting 3 AutoFormat. And you've created a custom AutoFormat.

RALPH SOUCIE
WINTERPORT, MAINE





2	A	B	C	D
1	Region	Plan	Actual	Variance
2	Far West	238400	223846	-14554
3	Southwest	7800	14674	6874
4	Mountain	54600	56216	1616
5	Midwest	824000	829249	5249
6	Mid Atlantic	0	537	537
7		1124800	1124522	-278



4	A	B	C	D
1	Region	Plan	Actual	Variance
2	Far West	$ 238,400.00	$ 223,846.00	$ (14,554.00)
3	Southwest	7,800.00	14,674.00	6,874.00
4	Mountain	54,600.00	56,216.00	1,616.00
5	Midwest	824,000.00	829,249.00	5,249.00
6	Mid Atlantic		537.00	537.00
7		$1,124,800.00	$1,124,522.00	$ (278.00)

ADD CHARACTER TO WORD

Question: *Word for Windows is a fine program, but I haven't found an easy way to insert the diphthong æ combination. How do you do it?*

GUNNAR GREEN
VENTURA, CALIFORNIA

Answer: Personally spæking, we wouldn't bother. After all, unless you work for *Encyclopædia Britannica* you probably aren't going to have too much use for it. But since you asked, we'll assume that you're using Word 6.0 for Windows. All you have to do is open a new document and choose Insert, Symbol and you'll pull up a dialog box full of all the special symbols and characters you can insert. The æ you're looking for may not be in the default symbol set that this dialog box uses, so pull down the Font list and choose another—both Arial and Times New Roman have it. You can then do a one-time insertion by selecting æ (which is on the bottom row of this font set). Or you can assign a shortcut key to this

HOT TIP SAVE WINDOWS INI FILES

Problem: You keep reading about how important it is to save backup copies of the Windows files WIN.INI, SYSTEM.INI, and CONTROL.INI. Making backups manually is a chore, though. So you want to create a little batch file that you can run every time you're ready to turn off your PC to keep the last few copies of each file.

Solution: For the first time only, get into your Windows directory and copy WIN.INI to WIN.-1, then to WIN.-2, then WIN.-3, and WIN.-4. Do the same for SYSTEM.INI and CONTROL.INI.

Next, create a batch file called OFF.BAT with the following lines:

```
C:
CD \WINDOWS
DEL WIN.-4
RENAME WIN.-3 WIN.-4
RENAME WIN.-2 WIN.-3
RENAME WIN.-1 WIN.-2
COPY WIN.INI WIN.-1
```

Retype the last 5 lines using SYSTEM, and again using CONTROL instead of WIN.

Type OFF before powering off and you'll always be able to return to settings from the last few days.

TED SWIRSKY
VIA THE INTERNET

character by clicking on the Shortcut Key button, then typing the key combination you want to use (try Ctrl-Shift-A, which is assigned by default to All Caps—a feature most people don't use), then click on Assign, Close, and Close. When you want æ, just press Ctrl-Shift-A. **YL**

MAKING ROOM

Question: *I have Stacker 4.0, MS-DOS 6.20, and Windows for Workgroups 3.11. Which DoubleSpace files can I delete to save space without affecting Stacker? And what else can I safely remove to save space?*

BOB SMITH
LAKE JACKSON, TEXAS

Answer: You can delete every file in the \DOS directory whose name begins DBL*. But whatever you do, don't delete the DBLSPACE.BIN file that lives in your root (\) directory! Stacker uses it. Fortunately, it's marked hidden, system, and read-only, so you'd have to go through a few contortions to remove it.

All that said, deleting all these won't free up very much space—well under 1MB. If you really want to save some disk space, make sure your hard disk is healthy (run SCANDISK, then delete any temporary files). Then go into Windows and run Windows Setup (in the Main group). Select Options, Add/Remove Windows Components. From here you can delete all sorts of files: Wallpapers, sounds, readme files, and the help files that go with Windows accessories (not to mention the Windows accessories themselves). **YL**

HELP FOR IFSHLP.SYS

Question: *When I upgraded to Windows for Workgroups 3.11, the installation added a new line to my CONFIG.SYS called IFSHLP.SYS. What is it and what does it do?*

KEVIN L. REED
TROY, NEW YORK

Answer: With a name like IFSHLP.SYS, it's *got* to be good. This is Windows for Workgroups' Installable File System. It's a pretty clever little device driver: Not only does it enable Windows for Workgroups to access all kinds of network drives, it's the real-mode component of Windows 32-bit file access (a protected-mode cache).

So, our recommendation is to leave this driver alone and use Windows for Workgroups' 32-bit file access (go into Control Panel, select 386 Enhanced, then Virtual Memory to turn it on). Loading IFSHLP.SYS can cause problems for certain networks (Artisoft LANtastic and IBM LAN Server, for example), but it's usually very useful. **JM**

A BETTER WAY

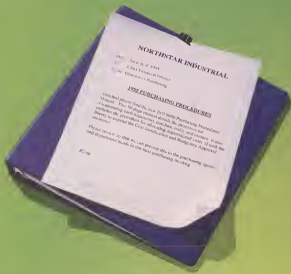
Question: *I manage several Windows systems that are shared among users. Sometimes less experienced users mess up the settings—moving icons around and such. Some of them save their settings when they exit Windows, so the next person to use the system gets a mess. I figured out how to fix this: Go into the WINDOWS directory and set the attributes of all the files that end in GRP, INI, and PIF to read-only, so that Windows comes up the same every time. Is there an easier way to do this?*

GARY GUANCIALE
ELBRIDGE, NEW YORK

Answer: Windows provides its own mechanisms for protecting its settings; just edit your PROGMAN.INI file. Using a text editor such as Windows' Notepad, open PROGMAN.INI (it's located in the \WINDOWS directory). Find the section called [Restrictions], and add any (or all) of the following:

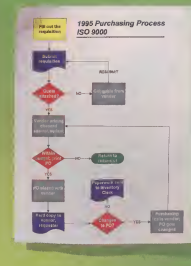
```
EditLevel=4
NoSaveSettings=1
NoRun=1
NoClose=1
NoFileMenu=1
```

Adding all of these restrictions will lock Windows up tight as a drum (note that if you have NoFileMenu, you don't need NoRun). The first disables the creation, deletion, or changing of any of the program groups or items. NoSaveSettings keeps Windows from saving the settings anybody makes. NoRun disables the File, Run menu option. NoClose makes it impossible to exit Windows (you'll have to



(Sort through a fifty page plan to get to the point.)

or



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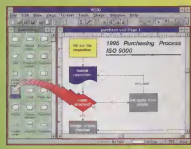

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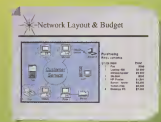

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reboot!). And NoFileMenu removes the File menu altogether, including all of its submenus. **JM**

RESTORING WINDOWS

Question: *I own Borland Office 2.0 for Windows, which includes Quattro Pro 5.0 for Windows. I also run Windows for Workgroups 3.11. Every time I start Quattro Pro, it begins as a maximized application. I then have to restore it manually (by mouse or keyboard) so I can access minimized applications lined up across the bottom of the desktop. Every other Windows application I run (Borland Office or otherwise) seems to open in the same condition (maximized or restored) and position as when I last closed it. I've tried Quattro Pro's opening macro feature, but it doesn't seem to recognize the Alt-space required to open the Control menu. The WindowRestore macro simply restores the active notebook. Is there a way to open Quattro Pro 5.0 for Windows in a restored condition?*

LEE SMALL
VIA COMPUSERVE

Answer: First the good news. Quattro Pro 6.0 has a better memory than its predecessor had. Its window state, position, and size settings at startup remain the same as when you last ran the program.

If you haven't upgraded to Version 6.0, you can set up a simple macro that is executed whenever you start up. This macro simply "unmaximizes" the application's window (it does not restore the size and location when it was last used). To create the macro you need to edit the QPW.INI file, which is located in the Windows directory. You can use any editor that saves files in ASCII format, including Notepad. Add the following line anywhere under the section headed [Quattro Pro for Windows 5.0]:

```
InitMacro={MENU}{LEFT}~~
```

If there's already a setting for InitMacro, make a backup of QPW.INI, then add the text that's at the right of the equal sign to the beginning of the existing InitMacro text. This macro simulates the following keystrokes: F10, the left arrow key, and Enter (twice). If you type in these keystrokes when Quattro Pro is active and there are no open notebooks, you'll see that they select the Restore menu item on the application's Control menu. **JW**

HALF-BAKED HALFTONES

Question: *When upgrading to the Hewlett-Packard LaserJet 4M Plus and WordPerfect for Windows 6.0a, I was disappointed to find that vendors have taken a step backward in supporting halftones. It's obvious that a major destination of all those fancy graphics images, including scanned photos, is the photocopier. However, you just can't get decent reproduction with most photocopy equipment, especially the fast kind, with halftone densities much above 65 lines per inch. Yet HP and Adobe Windows drivers, which once allowed you to adjust halftone angle and density, no longer do. WordPerfect drivers used to allow gross but separate adjustment for text and graphics, and now only allow a single control for draft, medium, and high print quality. Any decent word processor ought to allow control over halftone lines per inch without sacrificing print quality. How can I get better support for halftones?*

MICHAEL MARCUS
PORTLAND OREGON

Answer: The Standard or Spot Function on earlier LaserJet printers let you manipulate the angles, and so on. The Enhanced Halftone of the LaserJet 4M Plus does not. 4M Plus customers who want the flexibility of the Standard Halftone, can find a set of batch files on the "PostScript Printer software for Windows 3.1" disk that comes with the 4M Plus. The file is called spot_ht.ps. You'll have to copy the batch file to the printer. It typically stays resident until the printer is power-cycled, or until a larger, more complex print job arrives and needs more memory. This batch file disables the Enhanced Halftone. **MS**

SLOW PRINTING

Question: *My printer is so slow I'm going crazy. Sometimes, my graphics won't print at all—if they are too large, if there are too many of them, or if they are too complicated. No matter how much RAM I add to my Hewlett-Packard Laser Jet 4, it still prints slowly. I think I've bit a point of diminishing returns. Why?*

RALPH REHWOLDT
MIAMI, FLORIDA

Answer: Hewlett-Packard sets the defaults in the Windows PCL driver to operate most efficiently with the majority of documents that customers print. For some complex documents, you may need to change the driver settings and/or increase the amount of memory to improve the printer's performance. With HP's later addition of Memory Enhancement Technology (MET) to the LaserJet 4 family of printers (beginning with the LaserJet 4L), this problem has been greatly

HOT TIP VIDEO UNDER WINDOWS

Problem: You're running a program that uses QuickTime for Windows video compression (such as Myst) and the video looks somewhat scrambled or stretched out. You need a way to fix this.

Solution: Edit the QTW.INI file in your C:\WINDOWS directory with any text editor (such as DOS EDIT or Windows' Notepad). Go to the section [Video] (if it's not there, create it), and modify what comes after optimize= so that it can read drivers. Now QuickTime will use your video card's drivers rather than talking directly to your hardware.

CY TYMONY
HAWTHORNE, CALIFORNIA

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reduced. If you're experiencing memory difficulties with the HP LaserJet 4 printer, try these tips:

HP LaserJet printers let users set aside additional memory for printing complex documents. Do this by changing the printer's Page protection setting in the Windows PCL driver to Letter, Legal, or A4 (depending on the paper size on which you are trying to print). The User's Manual (pages 2 through 28) and the online help give directions on adjusting these settings to deal with complex documents.

Contact HP Direct Distribution, referenced on the inside cover of the manual, to obtain the latest version of the Windows PCL driver (V.1.35) for the LaserJet 4L. HP has worked closely with many vendors to design new drivers to address memory issues.

HP LaserJets also let you set the mode in which graphics are printed. You do this by changing the Graphics mode setting in the driver (located under the Options button) to Raster. This setting may allow your complex documents to print correctly. The online help provides instructions for changing these settings, as well as why and when to use them. **KKC**

SOUNDING OFF

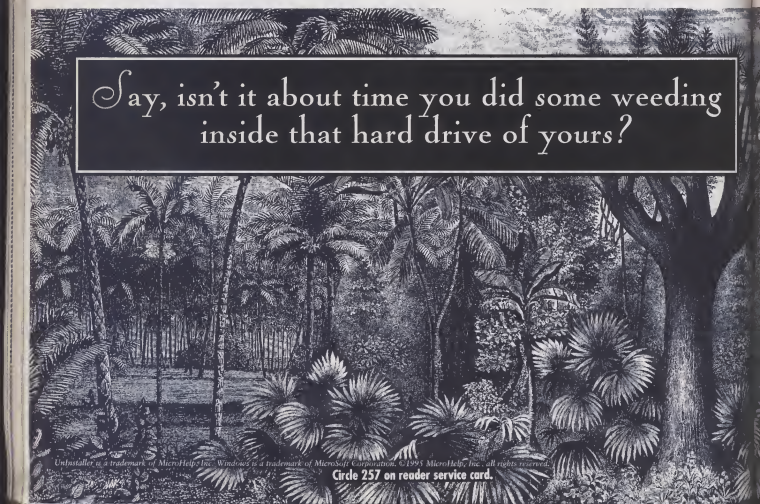
Question: *I have a Sound Blaster compatible sound card on my system. This card has a PC speaker connector to connect the motherboard's sound output. I wanted to hear the sound that goes to the PC speaker through the sound card, so I connected the wire to the sound card. When I turned the PC on, no speaker sound came out. Since the sound card connector didn't specify which was the positive and the negative, I switched them. Then the PC didn't turn on when I connected it, so I connected the motherboard's wire back to the PC speaker. The PC kept passing the memory test and starting the boot process again and again. I disconnected the PC speaker wire from the motherboard and the problem went away. Now, the PC works fine but I can't connect the speaker because it won't start. What has happened?*

MARIO E. VERAS
VIA THE INTERNET

Answer: It's unlikely that you've damaged your PC because the speaker outputs on most systems are protected against this kind of injury. It sounds like your PC is trying to beep into a short circuit, and the short draws just enough current to briefly lower its supply voltage down to a level that causes a reset. But this could happen only in a PC with an unusual design and marginal power supply.

If one of the speaker leads on your PC is grounded (an unusual arrangement), the problem could be caused by connecting the speaker wire with its leads reversed. Correct the connection and your PC and its speaker should come back to life.

The speaker wires in most PCs



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plug in to the motherboard and are permanently connected to the speaker. If you unplugged such a wire from the motherboard and plugged it in to your sound card, the audio from the motherboard could not reach the sound card because the connection links the speaker—not the motherboard—to your sound card. Such a faux pas could also explain why your PC played dead when you reversed the wire. If one side of the speaker is grounded, the reversed connection could short out the entire power supply and the protection circuitry in your PC would prevent the system from turning on. You'll need to run a wire from the motherboard to the sound card to get speaker audio into the sound card. **WR**

TOP OF THE CHARTS

Question: *I'm using Lotus 1-2-3 Release 2.3 and MS-DOS 6.2. I would like to superimpose one chart on top of another (to look at relationships) and move the values of chart2 to the opposite side of the chart. I can do that with Freelance but not in the Lotus 1-2-3 Wysiwyg mode. Suggestions?*

WALT FOSTER
VIA THE INTERNET

Answer: It can't be done. Lotus 1-2-3's Mixed chart type might seem like the way to go, but you'll discover that this chart type can't use separate scales for the left and right *y*-axes. One option is to create two separate charts—one with the *y*-axis labels displayed on the right. You can then insert both charts into your worksheet in exactly the same range and select the Opaque setting. Unfortunately, you'll find that they don't line up correctly. **JW**

Compiled and edited by JAMES OLIVER CURY. *Technical assistance provided by* KYLA K. CARLSON, YAEL LI-RON, JOHN MONTGOMERY, SCOTT NAYLOR, WINN ROSCH, MARCIA STUART, *and* JOHN WALKENBACH.

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SPEC WATCH **CD-ROM Drives**

The Next Generation Just when you thought double-speed CD-ROM drives were the emerging standard, along came quad-speed drives to up the ante. But which kind of drive is best for your needs? Technical Director Adam Meyerson tells you what to look for in a double-speed or quad-speed drive, including the best access time, interface options, and bundled software. **227**

Spec Watch Before your next hardware investment, check out our recommended specs:

Portable PCs 228
Desktop Systems 228
Modems 229
Laser Printers 229

Direct to You ADVERTISERS' INDEX:

VENDOR NAME	PAGE NO.	HOURS OPEN	800 NUMBER
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L.A. Trade	264	M-F 8-5; Sat 10-12 (PST)	800-433-3726
Megahaus	231	M-F 8-8; Sat 9-3(CST)	800-786-1187
Midwest Micro	239-245	M-F 9-7; Sat 10-4	800-682-7248
NECX	250-251	M-F 8-8; SAT 10-6 (EST)	800-961-9209
PC's Compleat	247-249	M-F 24 Hours; Sat-Sun 8-8 p.m.	800-598-4727
Relisys	230	M-F 8-5, SAT 9-3 (PST)	800-945-0900
USA Flex	258-259	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
PRINTERS			
Innovation/Sunshine	267	M-F 9-9; Sat 10-6; Sun 12-5 (EST)	800-854-7754
NECX	250-251	M-F 8-8; SAT 10-6 (EST)	800-961-9209
USA Flex	258-259	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
SOFTWARE			
Computer Discount Warehouse	260-263	M-F 7:30-7:30; Sat 9-5 (CST)	800-473-4CDW
First Source International	233	M-F 8-5; Sat 9-3 (PST)	800-474-9866
Insight	224	24 Hours	800-535-1530
NECX	250-251	M-F 8-8; SAT 10-6 (EST)	800-961-9209
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First Source International	233	M-F 8-5; Sat 9-3 (PST)	800-474-9866
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WorldWide Technology	254	M-F 9 -9; Sat 10-6	800-636-6792
NOTEBOOKS			
Innovation/Sunshine	267	M-F 9-9; Sat 10-6; Sun 12-5 (EST)	800-854-7754
Insight	224	24 Hours	800-927-3159
Midwest Micro	239-245	M-F 9-7; Sat 10-4	800-682-7248
NECX	250-251	M-F 8-8; SAT 10-6 (EST)	800-961-9209
PC's Compleat	247-249	M-F 24 Hours; Sat-Sun 8-8 p.m.	800-598-4727
SAGER	252-253	M-F 7-6; Sat 9-3 (PST)	800-669-1624
USA Flex	258-259	M-F 24 Hours; Sat-Sun 9-4	800-723-0334
ON-LINE SERVICES			
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Insight	224	24 Hours	800-998-8044
Megahaus	231	M-F 8-8; Sat 9-3(CST)	800-786-1187
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GETTING FASTER ALL THE TIME

CD-ROM Drives: Quad Is Best Choice

Do you think CD-ROM drives are just for gamers and hardware gluttons? Think again. Packing over 600MB, a single CD-ROM can house anything from an entire law library to a complete set of cross-country maps. So, whether you're driving home a legal point or just driving, it's time you started treating CD-ROMs as mainstream business tools. At a minimum, start with the MPC 2 specification, which calls for a double-speed drive. The first generation of drives transferred data at a maximum of 150 kilobytes per second (150KBps) and are now dubbed single-speed drives. Each successive generation has cranked up the transfer rate: Double-speed drives transfer data at 300KBps, triple-speed drives top out at 450KBps, and quad-speed drives hit 600KBps. Most CD-ROM drives on the market today are double-speed, with a new generation of quad-speed drives quickly emerging. Triple-speed drives came and left without making a wave, showing relatively few benefits for a high price. For multimedia and reference titles, or for loading software, a double-speed drive is sufficient, but it's only a short-term solution. Quad-speed drives are dropping in price and will become standard equipment in systems sometime soon. Looking into the future, a quad-speed CD-ROM drive will be your best choice.

Beyond transfer rate—also known as throughput—access time is a key performance indicator. While the MPC 2 spec allows for a maximum access time of 400ms, don't settle for anything slower than 200ms. Several drives now available in the 150ms to 175ms range will dramatically outperform even the fastest drives from a year ago.

To integrate a CD-ROM drive into your system, you'll have to pick an interface. Until recently your choices were limited to the proprietary interfaces (from Sony, Panasonic, and Mitsumi) supplied on most sound cards, or standard SCSI (requiring a SCSI host adapter) from any of a dozen companies. Many sound cards are starting to offer onboard SCSI connectors, which are the best choice. Some new systems are also including Enhanced IDE as basic equipment—another safe industry standard. Usability extras to look for include a headphone jack, front panel controls, and bundled software for playing audio CDs. ADAM MEYERSON

CD-ROM DRIVES

DEMAND DOUBLE- OR QUAD-SPEED AND **MPC 2** COMPATIBILITY

USABILITY

A. Door Cover: Double doors on drive to deter dust.
B. Control: Audio output jack and manual volume control.
C. Installation: IRQs set through software, not jumpers or dip switches.

FEATURES

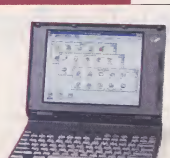
1. **Performance:** 200ms access time or faster.
2. **Interface:** SCSI-2.
3. **Buffer:** 64K or larger.
4. **Buffer:** 256K or larger.
5. **Compatibility:** MPC 2.
6. **Compatibility:** High Sierra and ISO-9660.
7. **Compatibility:** CD-Audio and Kodak Photo CD.
8. **Applications:** Bundled CDs.

DECISION MAKER

1 What's more important?	2 What kind of titles?	3 This is a minimum configuration:	4 Look for these features . . .
Multimedia	5 or More Commercial Titles	Quad-speed Drive with 150KBps to 600KBps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8
	Proprietary, or Fewer than 5 Commercial Titles	Double-speed Drive with 150KBps to 300KBps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8
Text & Static Images	5 or More Commercial Titles	Double-speed Drive with 150KBps to 300KBps Transfer Rate	Usability: A, B, C Features: 1, 2, 3, 5, 6, 7, 8
	Proprietary, or Fewer than 5 Commercial Titles	Double-speed Drive with 150KBps to 300KBps Transfer Rate	Usability: A, B, C Features: 1, 2, 3, 5, 6, 7, 8

PORTABLE PCs

COLOR RULES AT **LESS THAN SEVEN POUNDS**



USABILITY

- **A. Display:** 9.5-inch active-matrix or dual-scan passive-matrix color display.
- **B. Display:** 7.5-inch or larger dual-scan passive- or active-matrix color display.
- **C. Weight:** Total traveling weight less than 12 pounds.
- **D. Weight:** Total traveling weight less than 7 pounds.
- **E. Key Spacing:** Cursor controls and function keys at least half the size of QWERTY keys.
- **F. Batteries:** Swappable without powering down.
- **G. Battery Life:** At least 4 hours with power management set at half mast.

FEATURES

1. **RAM:** Expandable to at least 20MB.
2. **Slots:** Two Type II (or one Type III) PC Card.
3. **Slots:** At least one Type II PC Card.
4. **Ports:** Serial, parallel, VGA, keyboard, and PS/2 mouse.
5. **Sound:** Integrated sound chip.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features . . .
Desktop Use	Multimedia, Application Development, Graphics	75MHz DX4, 16MB of RAM, 500MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4, 5
	Word Processing and/or Spreadsheets	50MHz 486DX2, 8MB of RAM, 250MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4
Traveling Machine	Presentations, Communications	50MHz 486DX2, 8MB of RAM, 170MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4, 5
	Word Processing, Spreadsheets, Databases	33MHz 486, 8MB of RAM, 120MB Hard Drive	Usability: B, D, E, F, G Features: 3, 4

DESKTOP SYSTEMS

WHETHER A 486 OR PENTIUM, **STOCK WITH RAM**

USABILITY

- **A. BIDS:** Flash BIOS for easy upgrade.
- **B. Case:** Tool-free cover removal.
- **C. CPU:** ZIF CPU socket.
- **D. RAM:** Easy access to SIMMs.
- **E. Hard Drive:** Enhanced IDE.

FEATURES

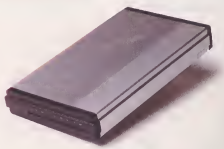
1. **Cache:** 256K.
2. **RAM:** Expandable to 64MB.
3. **Monitor:** 17-inch.
4. **Monitor:** 21-inch.
5. **Video:** 64-bit VL-bus or PCI accelerator with 2MB of RAM.
6. **Video:** 64-bit VL-bus or PCI accelerator with 4MB of RAM.
7. **Hard Drive:** Enhanced IDE or SCSI-2.
8. **Sound:** 16-bit sound card (Sound Blaster compatible).
9. **CD-ROM:** Quad-speed Enhanced IDE or SCSI drive.
10. **Slots:** Three PCI or VL slots.
11. **Ports:** Two serial, one parallel, keyboard, mouse.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features . . .
Text & Numbers	Word Processing & E-mail	66MHz 486DX2, 8MB of RAM, 340MB Hard Disk, 15-inch Monitor	Usability: A, B, C, D, E Features: 5, 7, 8, 9, 10, 11
	Spreadsheets & Databases	Pentium 75, 16MB of RAM, 500MB Hard Disk, 15-inch Monitor	Usability: A, B, C, D, E Features: 1, 2, 4, 6, 7, 8, 9, 10, 11
Graphics, Design & Multimedia	Drawings, Presentations & Flowcharts	Pentium 75, 16MB of RAM, 500MB Hard Disk, CD-ROM Drive	Usability: A, B, C, D, E Features: 1, 2, 3, 6, 7, 8, 9, 10, 11
	CAD, 3-D Rendering, & Image Editing	Pentium 90 or 100, 32MB of RAM, 1GB Hard Disk, CD-ROM Drive	Usability: A, B, C, D, E Features: 1, 2, 4, 6, 7, 8, 9, 10, 11

MODEMS

WHEN IN DOUBT, GET THE **FASTEST** YOU CAN FIND



USABILITY

A. Display: Labeled LCD on external models.
B. Compatibility: Able to use slower transmission rates.
C. Software: Communications software for data and fax.
D. Port Selection: COM1 through COM4.

FEATURES

1. Compatibility: V.32 bis, V.42 bis, V.42, ITU-1 Group 3, Class 1, Class 2, Hayes command set.
2. Compatibility: V.34.
3. Audio: Integrated voice, data, and fax.
4. Speed: 16550 UART.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features . . .
Remote Access	Small Downloads, Short Sessions	14.4Kbps with Fax	Usability: A, B, C, D Features: 1, 3, 4
	Large Downloads, Long Sessions	28.8Kbps with Fax	Usability: A, B, C, D Features: 1, 2, 3, 4
Online Services	Research, E-mail, Small Downloads, Chats	14.4Kbps with Fax	Usability: A, B, C, D Features:
	Internet/Web, E-mail, ftp, Downloads	28.8Kbps with Fax	Usability: A, B, C, D Features:

LASER PRINTERS

LOOK FOR 4 TO 8 PAGES PER MINUTE AND **PCL 5**

USABILITY

A. Emulation Switching: Automatic, all ports active.
B. Paper Tray: 200-sheet or larger with envelope feed.
C. Cartridges: One or more HP-compatible cartridge slots.
D. Footprint: 260 square inches or less.
E. RAM: User-upgradable memory and interface.
F. Power Management: Automatic sleep mode or EPA Energy Star compliance.
G. Display: LED panel or software utility for paper jams, errors, and status.

FEATURES

1. Printer Language: PCL 5 emulation.
2. CPU: RISC.
3. RAM: 2MB.
4. RAM: 4MB or more.
5. Fonts: 35 or more resident (at least 10 TrueType).
6. Fonts: 45 or more resident (at least 10 TrueType).
7. Interface: Bidirectional parallel interface.

DECISION MAKER

1 What will you use it for?	2 How many pages a day?	3 This is a minimum configuration:	4 Look for these features . . .
Text & Simple Business Graphics	More than 20	8 ppm, PCL 5, 300 dpi or Higher	Usability: B, C, D, E, F, G Features: 2, 3, 5, 7
	20 or Fewer	4 ppm to 6 ppm, PCL 5, 300 dpi or Higher	Usability: C, D, E, F, G Features: 2, 3, 5, 7
Graphics-Laden Documents	More than 20	8 ppm, PostScript, 600 dpi	Usability: A, B, C, D, E, F, G Features:
	20 or Fewer	4 ppm to 6 ppm, PostScript, 600 dpi	Usability: A, B, C, D, E, F, G Features:

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Reli9624T Advantage

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- 9600 X 9600 interpolated
- Transparency Adapter for film, slides and x-rays
- SCSI-2 Interface
- ArtScan Pro

$1,099

PC COMPUTING "Top 100" 1995

Reli4830T Advantage

Features
- 600 X 1600 dpi optical one pass scanner
- 4800 X 4800 interpolated
- A4 size Transparency Adapter for film, slides and x-rays
- SCSI-2 Interface
- ArtScan Pro

$859

Reli4816T Advantage

Features
- 600 X 1600 dpi optical one pass scanner
- 4800 X 4800 interpolated
- SCSI-2 Interface
- ArtScan Pro

$799

Reli2412 Advantage

Features
- 300 X 1200 dpi optical one pass scanner
- 2400 X 2400 interpolated
- SCSI-2 Interface
- ArtScan

$499

Avec 2400 Advantage

Features
- 300 X 600 dpi optical three pass scanner
- 2400 X 2400 interpolation
- SCSI-2 Interface
- ArtScan

$449

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During the first year of your warranty, we replace: not repair, any defective items. All items receive lifetime technical support from our factory trained techs.

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Maxtor

FREE Max Blast auto install software (with 540MB and larger)
2 Yr "No Quible Service Policy" offers advanced replacement.

420MB	$175	1050MB	$349
540MB	$189	1260MB	$369
850MB	$245		

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530MB	13.8ms	4500rpm	IDE/SCSI
1080MB	9.5ms	5400rpm	SCSI
2100MB	9.5ms	7200rpm	SCSI

2yr wty. $195 / $209
5yr wty. $479
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MICROPOLIS

Best buy large capacity SCSI drives!
5yr advanced replacement warranty.

2050MB	8.5ms	7200rpm	MC4221 $939
4294MB	8ms	7200rpm	MC4243 $1325
9100MB	12ms	5400rpm	MC1991 $2189

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(* $10 cartridge is a limited promotion. Begins April 12, 1994. Limited to the first 200 orders.)

OPTICAL DRIVE SALE!

Price includes 1 FREE disk! Complete internal and external kits available for all computers.

Capacity	Brand	Speed	Buffer	Wty	Price
230MB	Fujitsu	30ms	256K	1yr	$569
1.3Gig	NEC	25ms	1MB	2yr	$1679
1.3Gig	Maxoptix	23ms	4MB	1yr	$2149

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Recordable CD's Qty 50 $8.50ea Qty 100 $8ea

HARD DRIVES

CONNER PERIPHERALS

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540MB	15ms	CFS540A	$199
850MB	10ms	CNR850A	$252
1275MB	9ms	CNR1275A	$368

SCSI

1080MB	11ms	CFP1080S	$469
2147MB	8.5ms	CFP2105S	$879
2147MB	8.5ms	CFP2107S	598$

MICROPOLIS

SCSI

2050MB	8.5ms	MC4221	$939
4294MB	8ms	MC4243	$1325
9100MB	12ms	MC1991	$2189

WIDE SCSI

2050MB	8.5ms	MC4221W	$1079
4294MB	8ms	MC4243W	$1499
9100MB	12ms	MC1991W	$2399

SCSI-AV Audio / Visual tuned drives

2000MB	8.5ms	MC4221AV	$1039
4294MB	8ms	MC4243AV	$1459
9100MB	12ms	MC1991AV	$2329

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Seagate

IDE

420MB	14ms	ST3491A	$175
545MB	14ms	ST3660A	$190
722MB	12ms	ST3780A	$239
850MB	12ms	ST3850A	$240
1083MB	12ms	ST31220A	$350

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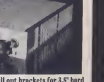

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Circle 239 on reader service card.

PC WORLD TOP 20
PC World
February 1995

PC MAGAZINE EDITORS' CHOICE
PC Magazine
June 28, 1994

PCC Best
PC Computing
April 1995

That's all About Tagram's Thunderbolt!

Over the past years, Tagram's Thunderbolt has been a favorite among high-tech circles and serious computer users. We don't have to tell you how good it is, we let the experts tell you what your choice should be.

"Zoooooom! OK, it's fast—the fastest system we've tested yet. OK, it's inexpensive—$450 less than MidWest Micro's Elite P5-100. OK, I want to know where I can get one!"
—PC Computing April 1995

"Tagram Thunderbolt...the fastest PC we've tested."—PC World February 1995

"In terms of performance, the Tagram Thunderbolt lived up to its name and then some."—PC Magazine June 28, 1994

Thunderbolt P5-90 W-SCSI

- Intel Pentium 90MHz CPU
- 16MB RAM, 256K Cache
- 2GB Wide-SCSI Hard Drive, 8ms
- PCI Diamond Stealth 64 with 2MB
- PCI Wide-SCSI Controller
- 3.5" Floppy Drive, UART 16550 Fast IO
- Toshiba 4X SCSI CD ROM Drive
- 15" .28 Non-Interlaced Monitor
- Mid-Tower Case
- Enhanced 101 Keyboard/Mouse
- MS DOS 6.22 & WFW 3.11

$3595

$3695 for Pentium 100MHz
$3995 for Pentium 120MHz
+ $455 for Desktop Publishing Special (17" .26 Monitor and Diamond Stealth 2MB VRAM)

Thunderbolt P5-100M

- Intel Pentium 100MHz CPU
- 16MB RAM, 512K Cache
- 1.2GB Enhanced IDE Hard Drive
- PCI Diamond Stealth 64 with 2MB VRAM
- PCI Enhanced IDE Controller
- 3.5" Floppy Drive, UART 16550 Fast IO
- 4X CD ROM Drive, 195ms, 600KB
- 16 bit SoundBlaster Compatible Stereo
- Power Amplified Speakers
- 17" .26 Non-Interlaced Monitor
- Mid-Tower Case
- Enhanced 101 Keyboard/Mouse
- MS DOS 6.22 & WFW 3.11

$3305

$3605 for Pentium 120MHz
$3205 for Pentium 90MHz

yes It runs with NetWare
Ready! for OS/2
Solaris COMPATIBLE
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All Eyes Are On Quantex!

It's no wonder. After all, Quantex offers such terrific systems, incredible features and great prices folks just can't wait to see what we come up with next. We're always on the leading edge of technology for both performance and speed. And when you add in the kind of CD bundles we include, it's just bound to catch your eye and your imagination.

Just don't blink...you might miss something.

intel inside

Take a Good Look at All We Have to Offer!

You won't believe your eyes.

When it comes to pure power, seeing is believing. Pentium™ Processors blazing at **75MHz** through **120MHz** now benefit from third generation PCI technology! The new **Triton PCI Chip Set**[1] provides performance advancements of up to 30% over its predecessor in Windows application benchmarks!

And for peak video performance, we add the award-winning **ATI MACH 64** PCI Graphics Accelerator[2], the top choice for razor-sharp images, photographic image quality in up to 16.7 million colors, plus scorching speed! With performance that'll make you sit up and take notice, Quantex is an industry visionary.

intel inside

System Picture with Tower Case and 17" MAG Monitor.

Bundle MS-Comptons Interactive Encyclopedia, Dragon Lore, CardShop Plus Deluxe, Mayo Clinic Family Health Book, Quicken SE and Main Street select.

Bundle PO-The Complete Reference Library, Dragon Lore, EveryWhere USA Travel Guide, Quicken SE, and PerfectOffice standard.

(Main Street select includes Works, Infocentral, Grammatik, Webster's Dictionary, Clip Art for the home, Wallobee Jack "The Lost Lionardo" and Paper Planes)

(PerfectOffice standard includes WordPerfect 6.1, Quattro Pro 6.0, Infocentral, Presentations, Envoy and GroupWise)

Catch a Glimpse of the Future.

Quantex invites you to take a peek "under the hood" -- you'll find these systems packed with the market's hottest new technology. Like **Quad Speed CD-ROM** drives with 190ms Random Access time and a 256KB data buffer capacity -- that means smoother video display with no delays! We also provide your "on-ramp" onto the Information Superhighway with our speedy **14,400 and 28,800 baud** FAX/modems, plus one month's free access to **America On-Line®**, **CompuServe®**, and **Prodigy®** on-line services. Don't worry, your eyes are not deceiving you. Quantex's performance hardware gives you the ability to envision tomorrow's technology today.

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We're Looking Out for You.

We look after your system long after your purchase. Check out our 30-day Money Back Guarantee, One Year Free On-Site Service, and One Year Free Parts & Labor Warranty along with a lifetime of toll-free phone support. Plus, we even offer the **GE Service Protection Plus Plan** option, which keeps your Quantex system covered for three additional years. The more you read, the better we look!

PC WORLD

DEC. 94 JAN. 95
MAR. 95 APR.95

PC WORLD

"The Quantex QP5/90 is a classic Power Desktops Top 20 System...you get an incredible amount of machine for the money." (3/95)

COMPUTER SHOPPER

The Quantex QP5/90 is as close to a turnkey multi-media PC as any machine we've seen." (11/94)

QUANTEX
Microsystems, Inc.

Q486DX2/66 XM $1649

- Intel DX2™/66 Processor
- 8MB RAM, 128KB Fast Cache*
- 540MB 11ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- 64-Bit PCI Bus Graphics w/ 1MB
- 15" Digital .28mm Color Monitor
- 11-Bay Mid-Tower Case
- 101-Key keyboard & Mouse
- 14,400 Baud Fax/Modem
- Toshiba 4X CD-ROM Drive (190ms)
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- MS-DOS & Windows for Workgroups 3.11
- Quicken® Financial Manager-SE
- Bundle MS: Compton's Interactive Encyclopedia 95, Dragon Lore, Mayo Clinic Family Health Book, CardShop Plus Deluxe,and WordPerfect Main Street select.

Q486DX4/100 XM.....$1740
QP5/75 XM.....$1860

QP5/75 XM-1 $1949

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- Toshiba 4X CD-ROM Drive (190ms)
- 16-Bit Sound Card &Speakers
- MS-DOS & Windows for Workgroups 3.11
- Quicken®Financial Manager-SE
- Bundle MS: Compton's Interactive Encyclopedia 95, Dragon Lore, Mayo Clinic Family Health Book, CardShop Plus Deluxe,and WordPerfect Main Street select.

QP5/90 XM-1.....$2060
QP5/100 XM-1.....$2190

QP5/90 XM-2 $2099

- Intel 90MHz Pentium™Processor
- 8MB RAM, 256KB Fast Cache
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- 11-Bay Mid-Tower Case
- 101-Key keyboard & Mouse
- 14,400 Baud Fax/Modem
- Toshiba 4X CD-ROM Drive (190ms)
- 16-Bit Sound Card &Speakers
- MS-DOS & Windows for Workgroups 3.11
- Quicken® Financial Manager-SE
- Bundle PO: The Complete Reference Library, Dragon Lore, EveryWhere USA Travel Guide, and **WordPerfect PerfectOffice Standard**.

Q486DX2/66 XM-2*.....$1740
Q486DX4/100 XM-2*.....$1840
QP5/75 XM-2.....$1870
QP5/100 XM-2.....$2220

QP5/90 XM-3 $2389

- Intel 90MHz Pentium™ Processor
- 16MB RAM, 256KB Fast Cache
- 850MB 10ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- 64-Bit PCI Bus Graphics w/ 2MB
- 15" Digital .28mm Color Monitor
- 11-Bay Mid-Tower Case
- 101-Key keyboard & Mouse
- 14,400 Baud Fax/Modem
- Toshiba 4X CD-ROM Drive (190ms)
- 16-Bit Sound Card &Speakers
- MS-DOS & Windows for Workgroups 3.11
- Quicken® Financial Manager-SE
- Bundle PO: The Complete Reference Library, Dragon Lore, EveryWhere USA Travel Guide, and **WordPerfect PerfectOffice Standard**.

Q486DX4/100 XM-3*.....$1899
QP5/75 XM-3.....$2260
QP5/100 XM-3.....$2409
QP5/120 XM-3.....$2749

QP5/100 SM $2599

- Intel 100MHz Pentium™ Processor
- **Intel Triton PCI Chip Set Architecture**
- 16MB RAM, 256KB Fast Cache
- 850MB 10ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- **ATI MACH 64 PCI Accelerator w/ 2MB DRAM**
- 15"Digital .28mm Color Monitor
- 11-Bay Mid-Tower Case
- 101-Key keyboard & Mouse
- **28,800 Baud V.34 Fax/Modem**
- Toshiba 4X CD-ROM Drive (190ms)
- 16-Bit Sound Card w/Speakers
- MS-DOS & Windows for Workgroups 3.11
- Quicken® Financial Manager-SE
- Bundle PO: The Complete Reference Library, Dragon Lore, EveryWhere USA Travel Guide, and **WordPerfect PerfectOffice Standard**.

Q486DX4/100 SM*.....$2090
QP5/75 SM.....$2360
QP5/90 SM.....$2480
QP5/120 SM.....$2840

QP5/100 SM-1 $2999

- Intel 100MHz Pentium™ Processor
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- 1280MB 10ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- **ATI MACH 64 PCI Accelerator w/ 2MB DRAM**
- **Award-Winning 17" MAG Monitor**
- 11-Bay Mid-Tower Case
- 101-Key keyboard & Mouse
- **28,800 Baud V.34 Fax/Modem**
- Toshiba 4X CD-ROM Drive (190ms)
- 16-Bit Sound Card & Speakers
- MS-DOS & Windows for Workgroups 3.11
- Quicken® Financial Manager-SE
- Bundle PO: The Complete Reference Library, Dragon Lore, EveryWhere USA Travel Guide, and **WordPerfect PerfectOffice Standard**.

QP5/75 SM-1.....$2740
QP5/90 SM-1.....$2860
QP5/120 SM-1.....$3240

QP5/120 WS-1 $3199

- Intel 120MHz Pentium™ Processor
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- 16MB RAM, 256KB Fast Cache
- 1280MB 10ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- **ATI MACH 64 PCI Accelerator w/ 2MB VRAM**
- **Award-Winning 17" MAG Monitor**
- 11-Bay Mid-Tower Case
- 101-Key keyboard & Mouse
- **28,800 Baud V.34 Fax/Modem**
- Toshiba 4X CD-ROM Drive (190ms)
- MS-DOS & Windows for Workgroups 3.11

QP5/90 WS-1.....$2799
QP5/100 WS-1.....$2899

Upgrade Specials

"Options Available with System Purchase"

- **Add a Conner 420MB tape backup unit for $149 more.**
- **Add a Panasonic KX-6100 Laser Printer for $399 more.(6 ppm, 600 dpi class print quality, Windows'95 compatible)**

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[1] The Triton PCI Chip Set, and the ATI MACH PCI Accelerator is only available on selected advertised Models * All Pentium systems come with 256KB cache; 486DX2/66, 486DX4/100 systems come with 128KB cache standard. Some software packaging may be cosmetically different than pictures shown. CD Titles do not include Manuals. On-Site Service may not be available in certain remote areas. All returned items must have a Return Merchandise Authorization (RMA) number and must be in original packaging. The cost for returned freight is not included with any Money-Back Guarantees; shipping charges are non-refundable. Due to volatility of prices, Quantex does not offer a price protection policy. Prices and product descriptions subject to change without notice.Quantex Microsystems cannot be responsible for errors in typography or photography. The Intel Inside Logo, IntelDX2,are Pentium are trademarks of Intel Corporation. Some of the names or trademarks shown herein may be the property of other companies. Screen images simulated. Quantex 1995. All Rights Reserved

Mr. Boddy has been murdered, and his killer remains at large. But sometime today before the scheduled 8:00 p.m. reading of Mr. Boddy's last will and testament, the murderer will change the document to read in his or her favor.

Unfortunately Boddy's closest living relative, Mr. Green, is out of town on business and was not informed of his cousin's death. But those who have gathered at the Boddy mansion for the reading include Mrs. Peacock, his eccentric sister-in-law; Colonel Mustard, an old army buddy; Professor Plum, a dear friend and classmate during his days at Yale; Miss Scarlet, a "special friend"; and Mrs. White, his loyal servant of 25 years.

Please help us find the killer by determining who changed the will... where... and with what...

MIDWEST MICRO

The SoundBook II With
Convenience Is Served
To my sister-in-law Mrs. Peacock, I leave, upon my death, funds to be donated to build an aviary in your name at the zoo. However, I am not granting you control of Buddy Savings and Loan, member FDIC.
intel inside
TouchPad
POINTING DEVICE

Personality Modules...

7:45 p.m. and tensions are high. The anticipated reading of the will is only minutes away. But with so many unique personalities in one room... MidWest Micro's SoundBook II should feel right at home!

When the main course is murder, people tend to lose their appetite—but they still hunger for convenience. And that's where the *NEW* SoundBook II comes in. Featuring a programmable Personal TouchPad, two RAM compartments and a modular design, this MidWest Micro Notebook is dressed to kill. So before we interrogate the other suspects at the table, let's investigate the SoundBook II...

Powerful Features...Weak Alibi

Who *knows* where this portable was on the night in question? Weighing only 6 lbs., it could have gone *anywhere*! Some eyewitnesses claim they saw the SoundBook II with a built-in floppy drive at 6:37 p.m. While another source swears the same drive bay was carrying an AC adapter at precisely 6:40! What makes the SoundBook II such a master of disguise?—It uses special compact peripherals, A.K.A. Personality Modules, that fit its modular 3.5" drive bay. Enjoy the floppy drive and AC adapter modules that come with your SoundBook II. And feel free to order additional modules like a 3.5" CD-ROM drive, a 14.4 Kbps voicemail fax modem, an extra hard drive and an extra battery.

Evidence Stacked In Your Favor

If *speed* is your motive, you may want to check out MidWest Micro's Pentium™ Processor Based SoundBook Plus. Like the SoundBook II, it comes with 16-bit stereo audio and built-in speakers. But this SoundBook *also* features a 75 MHz or 90 MHz Intel® Pentium Processor. And if you think *that* sounds like a setup, get a load of The Real Warranty. It covers all MidWest Micro Notebooks for a full three year sentence—parts *and* hard labor included! We can only assume that Mr. Boddy (being of sound mind) would have loved both MidWest Micro SoundBooks.

Contributing To The Delinquency Of A Diner?

Although it's unlikely that these MidWest Micro Notebooks are capable of murder, they *may* be found guilty of aiding and abetting. In fact, one of these guests may have already used a SoundBook to change Mr. Boddy's will... Perhaps Mrs. Peacock is doing it *right now*!—Or maybe she's just playing a little Microsoft® Golf.

Since we have a little time before Mr. Boddy's lawyer arrives, let's reconstruct another way this heinous crime may have been committed...

" Fastest portable we've ever tested, a fine desktop replacement"
— *PC World*, April 1995

" MidWest Micro wowed us with its Elite Pentium SoundBook Plus, the first Pentium-90 notebook we've tested; its performance blows every other reviewed mobile out of the water."
— *PC World*, March 1995

" ...produced the highest Windstone 95 score of all reviewed systems"
— *PC Magazine*, January 1995

PC WORLD TOP 20 Mobile PCs

intel inside pentium

MIDWEST MICRO

IT'S IN OUR NATURE

Systems
1-800-682-7248

Peripherals
1-800-445-2035

Colonel Mustard
UP TO
120
MHZ
PENTIUM
intel inside
pentium
Mr. Boddy
my old friend and former command-
ing officer, Colonel Mustard, I leave
all royalties from the Boddy Press
Military Book Club, and hope for
your continued silence about certain
events which happened long ago.
TOP SECR

In The Kitchen With A MidWest Micro PC?

"It's darn fast and darn cheap."
— *PC Computing*, April 1995

"The Elite P5-90 is one of the fastest computers we've tested."
— *PC World*, January 1995

PC WORLD TOP 20 Power Desktops

*"I can't believe these people didn't put lunch on the itinerary," the Colonel grumbled. "And you would **think** a person with this much money could afford better lunch meat." Was it merely hunger pains that brought Colonel Mustard into the kitchen this afternoon? Or was it Mr. Boddy's MidWest Micro Home PC… and **revenge!**…*

Mustard hadn't touched a computer since his code cracking days in the Middle East. But this "MidWest Micro Home PC" looked nothing like *that* relic. Typing in the secret password with his one good hand, the Colonel checked his watch again. He knew exactly how long it would take the IntelDX4™ 100 Processor to find the will, make the changes and save them on the Home PC's 850 Mb hard drive. "Not bloody long at all," he said with a smirk.

Colonel Mustard had planned his strategy very carefully. And after reading six computer magazines cover-to-cover, he learned that MidWest Micro Desktop Systems are available with Intel486™ and Pentium™ Processors, double- and quad-speed CD-ROM drives, voicemail fax modems and hard drive capacities up to 1.6 Gb! And whether you order a multimedia-packed Home PC or an Office PC stocked with powerful business software, you should always expect an ambush of high performance. But even nine weeks at boot camp, two wars and a Purple Heart didn't prepare the Colonel for what he was about to witness…

Opening the Home PC's Microsoft® Family Bundle, Mustard found an arsenal of interactive CD-ROM software—Encarta™ 95, Works, Money, Scenes, Dangerous Creatures and Golf were his to conquer. Before he knew it, the 15" color screen had exploded into multimedia mutiny. And he was even *more* impressed with Microsoft Bob™. Featuring eight household management programs in one efficient package, this new recruit had all the makings of a great soldier.

By this time the Colonel was distracted from his original covert operation. So he set a course for the library to see what Mr. Boddy's *120 MHz Office PC* had to offer…

Who killed Mr. Boddy and changed his will? The rest of the investigation is up to you…

To find out "who dun it" and receive a FREE catalog dial 1-800-204-0318.

Systems may also include:

Microsoft Home

Accept only the finest… Caviar WESTERN DIGITAL

ENHANCED IDE

THE REAL 3 YEAR WARRANTY

MIDWEST MICRO

IT'S IN OUR NATURE

Systems
1-800-682-7248
Peripherals
1-800-445-2035

AD#M06

MidWest Micro Home PCs

DX2-66 PCI — $1699
#008765
- IntelDX2™ 66 Processor
- 8 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Local Bus Graphics with 1 Mb
- PCI Fast IDE Interface
- Quad-Speed CD-ROM Drive
- Microsoft® Bob™
- Microsoft Family Bundle — Encarta™ 95, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Stereo Sound Card
- Digital Quality Speakers
- 9624 Fax Modem with Voicemail
- 3.5" Disk Drive
- 14" SVGA .28 NI Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS® 6.22 and WFW 3.11
- EPA Energy Star Compliant
- The Real 3 Year Warranty

P5-75 PCI — $2199
#008742
- Intel® 75 MHz Pentium™ Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Quad-Speed CD-ROM Drive
- Microsoft Bob
- Microsoft Family Bundle — Encarta 95, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Stereo Sound Card
- Altec Lansing® Stereo Speakers
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-100 PCI — $3299
#008758
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1.2 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI® MACH 64 PCI Accelerator with 2 Mb
- Quad-Speed CD-ROM Drive
- Microsoft Bob
- Microsoft Family Bundle — Encarta 95, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers with Subwoofer
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 17" .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-90 PCI — $3099
#008759

P5-120 PCI — $3599
#008760

P5-120 PCI — $3999
#008769
- Intel 120 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1.6 Gb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Accelerator with 4 Mb VRAM
- Quad-Speed CD-ROM Drive
- Microsoft Bob
- Microsoft Family Bundle — Encarta 95, Works, Money, Scenes, Dangerous Creatures & Golf
- Microsoft Complete Baseball CD
- 16-Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers with Subwoofer
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 17" .26 1600 x 1200 ExactMatch Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-100 PCI — $3699
#008770

PC WORLD TOP 20 Power Desktops

ENHANCED IDE

Caviar — WESTERN DIGITAL

PC MAGAZINE EDITORS' CHOICE Dec 14, 1994

ATI Graphics XPRESSION — Perfecting the PC

Energy Star — EPA POLLUTION PREVENTER

MidWest Micro Office PCs

P5-75 PCI — $1999
#008776
- Intel 75 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Quad-Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf, Encarta 95, Works Multimedia Edition 3.0 & Money 3.0
- The Real 3 Year Warranty

P5-90 PCI — $2299
#008777
- Intel 90 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Quad-Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS® Office Professional, Bookshelf & Encarta 95
- The Real 3 Year Warranty

P5-100 PCI — $2499
#008778

P5-100 PCI — $3299
#008781
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1.2 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad-Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 17" .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Microsoft Natural Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf & Encarta 95
- The Real 3 Year Warranty

P5-90 PCI — $3099
#008782

P5-120 PCI — $4999
#008785
- Intel 120 MHz Pentium Processor
- 32 Mb RAM, 256 Kb Cache
- 1.6 Gb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Accelerator with 4 Mb VRAM
- Quad-Speed CD-ROM Drive
- 16-Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers with Subwoofer
- 28.8 S/R Fax Modem
- 3.5" Disk Drive
- 17" .26 1600 x 1200 ExactMatch Color Monitor
- 8-Bay Full-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Microsoft Natural Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf & Encarta 95
- The Real 3 Year Warranty

P5-100 PCI — $4699
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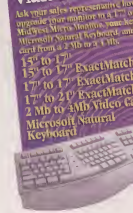
Monitor, Keyboard & Video Card Upgrades

Ask your sales representative how you can upgrade your monitor to a 17" or 21", a MidWest Micro Ultrafirm, foam keyboard or a Microsoft Natural Keyboard, and your video card from a 2 Mb to a 4 Mb!

15" to 17"	$209
15" to 17" ExactMatch	$319
17" to 21"	$429
17" to 21" ExactMatch	$779
2 Mb to 4Mb Video Card	Call
Microsoft Natural Keyboard	$59



intel inside — pentium PROCESSOR

Customizing Your System

If you don't see a system configuration which meets your needs, we'll be glad to customize a system for you. Choose your own case design, amount of RAM, hard drive size and other add-ons such as modems and multimedia kits.

TestDrive SUPERSTORE

All Systems with a CD-ROM include TestDrive CD Software and Microsoft Home CD Sampler

MidWest Micro SoundBook Plus Based On Intel's Pentium™ Processor

- Intel® Pentium™ 90 or 75 MHz Processor
- 64-Bit, 256 Kb Synchronous Burst External Cache
- 64-Bit, 8 Mb RAM (expands to 40 Mb)
- 10.3" Dual-Scan or 10.2" Active-Matrix VGA Display
- PCI Local Bus Video with 1 Mb VRAM
- PCI Local Bus HDD Controller
- 16-Bit Stereo Audio (Sound Blaster & Windows™ Sound System Compatible)
- Built-in Stereo Speakers & Microphone
- External Jacks for Line In & Line Out
- 3.5" Built-in Disk Drive
- User Replaceable Hard Drive
- Two Type II/One Type III PCMCIA Slots
- Integrated Pointing Device
- NiMH Battery & AC Adapter
- Advanced Power Management
- Bi-directional Parallel Port
- High Speed 16550 UART Serial Port
- Infra Red Wireless "IR" Interface
- External VGA & Keyboard/Mouse Port
- MS-DOS® 6.22 & WFW 3.11
- Microsoft® Works for Windows 3.0 & Golf
- Lotus® Organizer 2.0
- Weight 6.8 lbs.
- Carrying Case
- The Real 3 Year Warranty

Dual-Scan Color

P5-75 with 340 Mb HDD
#008090 **$2799**

P5-90 with 340 Mb HDD
#008029 **$2999**

P5-90 with 520 Mb HDD
#008025 **$3199**

P5-90 with 720 Mb HDD, 16 Mb of RAM & PCMCIA 14.4 Fax Modem
#008101 **$3799**

Active-Matrix Color

P5-75 with 340 Mb HDD
#008091 **$3799**

P5-90 with 520 Mb HDD & 16 Mb of RAM
#008027 **$4499**

P5-90 with 720 Mb HDD, 16 Mb of RAM & PCMCIA 14.4 Fax Modem
#008102 **$4799**

P5-90 with 720 Mb HDD, 32 Mb of RAM & PCMCIA 14.4 Fax Modem
#008105 **$5499**

Options

8 Mb RAM Card	#002558	$389
16 Mb RAM Card	#002559	$769
Mobile Max PCMCIA 130 Mb HDD	#004805	$289
Mobile Max PCMCIA 170 Mb HDD	#004806	$345
PCMCIA 14.4 Fax Modem	#002624	$129
PCMCIA Combo Ethernet Adapter	#001954	$139
Leather Carrying Case	#001515	$ 99

MidWest Micro SoundBook II

- IntelDX2™ or IntelDX4™ Processor with SMM Support
- Modular Design with Personality Modules
- 4 Mb RAM (expands to 36 Mb)
- 10.3" Dual-Scan or 10.2" Active-Matrix VGA Display
- Local Bus Video with 1 Mb
- 16 Bit Stereo Audio (Sound Blaster and Windows™ Sound System Compatible)
- 3.5" Floppy Disk Drive
- Two Type II/One Type III PCMCIA Slots
- Personal TouchPad Integrated Pointing Device
- NiMH Battery & AC Adapter
- Advanced Power Management
- One Parallel & One Serial Port
- External VGA & Keyboard Port
- MS-DOS 6.22 & WFW 3.11
- Microsoft Works for Windows 3.0 & Golf
- Lotus Organizer 2.0
- Weight: 6.0 lbs.
- Carrying Case
- The Real 3 Year Warranty

Dual-Scan Color

DX4-75 with 340 Mb HDD
#008141 **$1999**

DX4-75 with 520 Mb HDD & 8 Mb of RAM
#008106 **$2499**

DX4-100 with 520 Mb HDD & 8 Mb of RAM
#008142 **$2599**

DX4-100 with 720 Mb HDD & 8 Mb of RAM
#008108 **$2699**

DX4-100 with 720 Mb HDD, 16 Mb of RAM & PCMCIA 14.4 S/R Fax Modem
#008109 **$3199**

Active-Matrix Color

DX4-75 with 520 Mb HDD & 8 Mb of RAM
#008111 **$3199**

DX4-100 with 520 Mb HDD & 16 Mb of RAM
#008112 **$3799**

DX4-100 with 720 Mb HDD, 16 Mb of RAM & PCMCIA 14.4 Fax Modem
#008113 **$3999**

Options

Personality Modules		
– AC Adapter	#004794	$ 79
– Battery		Call
– 3.5" CD-ROM Drive	#004797	$429
– 14.4 Fax Modem with Voicemail	#004793	$145
4 Mb RAM Card	#006381	$199
8 Mb RAM Card	#002558	$389
16 Mb RAM Card	#002559	$769
128K Cache Upgrade	#004796	$ 69
Altec Lansing® ACS51 Speakers	#006712	$ 69
HP DeskJet 320 Printer	#004915	$309
Mobile Max PCMCIA 130 Mb HDD	#004805	$289
Mobile Max PCMCIA 170 Mb HDD	#004806	$345
PCMCIA 14.4 Fax Modem	#002624	$129
PCMCIA Combo Ethernet Adapter	#001954	$139
PCMCIA Panasonic Double-Speed CD-ROM Drive	#003728	$295
Leather Carrying Case	#001515	$ 99

* Ask your MidWest Micro sales representative about additional hard drive, screen and processor options.

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- 10.4" Active & Dual Scan
- Built-in AC adapter - small, sleek design & reduced weight
- Integrated Accupoint - small, accurate & easy to use

Processor	Screen	HD	Price
486DX4/75	10.4" Dual Scan	500MB	$3539
486DX4/75	10.4" Active	500MB	4679

T2150 as low as **$3539**

T2150

T4900

T4900CT

- 75Mhz Pentium - for blazing performance
- 10.4" Active Matrix display
- Built-in 16-bit sound, microphone, speaker & MIDI

Processor	Screen	HD	Price
Pentium 75	10.4" Active	772MB	$5499

T2100

T2100

- Integrated Accupoint - small, accurate & easy to use
- Built-in AC adapter - small, sleek design & reduced weight
- 10.4" Dual Scan display

Processor	Screen	HD	Price
486DX2/50	9.5" Mono	250MB	$1439
486DX2/50	10.4" Dual Scan	330MB	2249
486DX2/50	8.4" Active	330MB	3099

Other Toshiba Notebooks

Processor	Screen	HD	Price
T4800CT			
486DX4/75	9.5" Active	500MB	$3559
T4850CT			
486DX4/75	10.4" Active	500MB	$3889
486DX4/75	10.4" Active	772MB	4099
T3600			
486DX2/50	8.4" Active	500MB	$3719

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- PCI local bus hard drive
- 14.4 fax/modem, speaker phone, answering machine
- LOADS of FREE software

Force Desktop

Force Desktop

Chassis	Processor	HD	Price
Desktop	Pentium75	1.28GB	$1929
Desktop	Pentium100	1.28GB	2419

Monitors priced separately

Force Minitower

Force Minitower

Chassis	Processor	HD	Price
Minitower	Pentium75	1.28GB	$2299
Minitower	Pentium100	1.28GB	2759

Monitors priced seperately

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Processor	Screen	HD	Price
486DX2/50	10.3" Dual Scan	340MB	$2559
486DX4/75	10.3" Dual Scan	510MB	2749
486DX4/75	10.4" Active	510MB	3829
486DX4/75	10.4" Active	700MB	4129

Ascentia 810N

- 486DX2/66 processor – to speed through your applications
- 10.4" Dual Scan display
- Replace floppy w/ 2nd battery for 4-6 hrs. battery life

Processor	Screen	HD	Price
486DX2/66	10.4" Dual Scan	250MB	$1969
486DX2/66	10.4" Dual Scan	340MB	2109
486DX2/66	10.4" Dual Scan	510MB	2259

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TEXAS INSTRUMENTS

TravelMate 5000

TravelMate 4000M

- Brilliant color display
- 16-bit sound card
- Integrated pointing device
- 2 Type II or 1 Type III PCMCIA slot

Processor	Screen	HD	Price
486DX2/50	9.5" Dual Scan	340MB	$2119
486DX2/50	8.4" Active	455MB	2379
486DX4/75	9.5" Dual Scan	455MB	2459
486DX4/75	8.4" Active	340MB	2729
486DX4/75	8.4" Active	455MB	2979
486DX4/100	9.5" Active	525MB	3939

TravelMate 5000

- 10.4" Active Matrix display with 2MB Video RAM
- 10.5" Dual Scan display with 2MB Video RAM
- 65K colors on notebook display
- Built-In Dual Lithium Ion Batteries
- 16-bit Sound Card, Speaker, Microphone & MIDI
- User Replaceable 772MB Hard Drive (Active)
- User Replaceable 500MB Hard Drive (Dual Scan)
- Infrared port for wireless connections

Processor	Screen	HD	Price
Pentium 75MHz	10.5" Dual Scan	500MB	$4899
Pentium 75MHz	10.4" Active	772MB	5599

COMPAQ

Contura 410

LTE Elite

Contura 410

- Upgradable hard drive - easily add more storage
- 32-bit local bus with 1MB video RAM
- Extended life NiMH battery technology
- Compaq, 3-year worldwide warranty

Processor	Screen	HD	Price
486DX2/50	9.5" Dual Scan	350MB	$2369
486DX2/50	8.4" Active	350MB	2639

LTE Elite

- 10.4" Active Matrix display
- Fast 486DX4/75 processor
- Built-in AC adapter - small, sleek design & reduced weight
- Upgradable hard drive - easily add more storage

Processor	Screen	HD	Price
486DX4/75	9.5" Dual Scan	340MB	$3129
486DX4/75	9.5" Dual Scan	510MB	3499
486DX4/75	10.4" Active	510MB	5029
486DX4/75	10.4" Active	810MB	5389

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ThinkPad® 755CE, CSE & CD

- Built-in CD-ROM Drive (755CD models only)
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- 10.4" Active (65K colors) & 10.4" Dual Scan
- 14.4 fax/modem, speaker phone, answering machine & voice mail
- Built-in infrared

Processor	Screen	HD	Price
486DX4/100	10.4" Dual Scan	340MB	$4399
486DX4/100	10.4" Dual Scan	540MB	4481
486DX4/100	10.4" Dual Scan	810MB	4899
486DX4/100	10.4" Active	340MB	4999
486DX4/100	10.4" Active	540MB	5349
486DX4/100	10.4" Active	810MB	5799
486DX4/100	10.4" Active	540MB	6349*
486DX4/100	10.4" Active	810MB	6799*

*Features Built-In CD-ROM drive

More IBM® Notebooks

Processor	Screen	HD	Price
IBM ThinkPad® 360 & 360E			
486SL/33	8.4" Active	340MB	$1999
486DX2/50	9.5" Dual Scan	340MB	2699
486DX2/50	9.5" Dual Scan	540MB	3049
486DX2/50	8.4" Active	340MB	3099
486DX2/50	8.4" Active	540MB	3449

Processor	Screen	HD	Price
IBM ThinkPad® 701			
486DX2/50	10.4" Dual Scan	360MB	$3799
486DX2/50	10.4" Dual Scan	540MB	4149
486DX2/50	10.4" Active	360MB	4399
486DX2/50	10.4" Active	540MB	5149
486DX4/75	10.4" Dual Scan	360MB	4399
486DX4/75	10.4" Dual Scan	540MB	4749
486DX4/75	10.4" Active	360MB	5299
486DX4/75	10.4" Active	540MB	5649

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- Built-in infrared for no hassle printer connections
- Instant "ON" resume feature - lasts up to 1 week.

Processor	Screen	HD	Price
486DX2/50	8.5" Dual Scan	170MB	$2549
486DX2/50	8.5" Dual Scan	260MB	2829
486DX4/75	8.5" Dual Scan	170MB	3099
486DX4/75	8.5" Dual Scan	260MB	3379

HP OmniBook 4000

- 10.4" Active & 10.3" Dual Scan
- Built-in 16-bit sound, microphone & speaker
- Replace floppy w/ 2nd battery for 5-7 hrs. battery life
- Built-in infrared for no hassle printer connections

Processor	Screen	HD	Price
486DX2/50	10.3" Dual Scan	260MB	$2499
486DX2/50	10.3" Dual Scan	340MB	2829
486DX2/50	10.3" Dual Scan	520MB	3199
486DX2/50	10.4" Active	340MB	3769
486DX2/50	10.4" Active	520MB	4129
486DX4/100	10.3" Dual Scan	340MB	3619
486DX4/100	10.3" Dual Scan	520MB	3999
486DX4/100	10.4" Active	340MB	4489
486DX4/100	10.4" Active	520MB	4829

HP DeskJet 320 Printer

$299.99*

shown with optional feeder and color kit

HP Scanners

HP ScanJet 3P (grayscale)	$479.99
HP ScanJet IIcx (color)	949.99

HP (Colorado) Tape Drives

Trakker 250MB (portable)	$269.99
Trakker 350MB (portable)	339.99
Trakker 700MB (portable)	399.99
Jumbo 250MB (internal)	139.99
Jumbo 350MB (internal)	169.99
Jumbo 700MB (internal)	269.99
Jumbo 1400, 1.36GB (internal)	369.99
T1000, 800MB (internal)	199.99

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HP LaserJet 5MP printer (IBM&MAC, 600dpi)	1039.99
HP LaserJet 4L printer (IBM, 300dpi)	$499.99
HP LaserJet 4ML printer (IBM&MAC, 300dpi)	1019.99

HP InkJet Printers

HP DeskJet 320 printer (portable)	$299.99
HP DeskJet 320 printer w/feeder	359.99
HP DeskWriter 320 printer (portable)	299.99
HP DeskWriter 320 printer w/feeder	359.99
HP DeskJet 540 printer	289.99
HP DeskWriter 540 printer	289.99
HP DeskJet 560C printer	479.99
HP DeskWriter 560C printer	479.99
HP DeskJet 1200C printer	979.99
HP DeskJet 1200C/PS printer	1589.99
HP OfficeJet	769.99

NEC

Versa M

Versa P

Versa M

- High Res. displays available - 800x600 res. on notebook
- True color displays available - 16.7 million colors on notebook
- Removable/Reversible display
- Replace floppy w/ 2nd battery for 6-10 hrs. battery life
- Replace floppy w/ Versa Bay - Add extra PCMCIA
- Built-in 16-bit sound, microphone & speaker
- Upgradable hard drive - easily add more storage

Processor	Screen	HD	Price
486DX4/75	9.5" Dual Scan	250MB	$3049
486DX4/75	9.5" Dual Scan	340MB	3119
486DX4/75	9.5" Active	340MB	3739
486DX4/75	9.5" Active	540MB	3999
486DX4/75	9.5" True Color	340MB	3999
486DX4/75	9.5" High Res.	540MB	4399
486DX4/100	9.5" Active	340MB	4069
486DX4/100	9.5" True Color	540MB	4629
486DX4/100	9.5" Active	B10MB	4729
486DX4/100	9.5" High Res.	540MB	4729
486DX4/100	9.5" High Res.	B10MB	5099

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- Quad Speed CD-ROM drive
- 16-bit SoundBlaster compatible sound card
- PCI local bus - high-speed graphics
- 14.4 fax/modem, speaker phone, answering machine
- LOADS of FREE software

Chassis	Processor	HD	Price
Minitower	486DX4/100	540MB	$1699
Minitower	Pentium 75	B50MB	1999
Minitower	Pentium 90	B50MB	2299
Minitower	Pentium 90	1.2GB	2699
Minitower	Pentium 100	1.2GB	2999

Monitors priced separately.

Versa P

- 75Mhz Pentium - for blazing performance
- High Res. displays available - 800x600 res. on notebook (10.4" on selected models)
- Removable/Reversible display
- Replace floppy w/ 2nd battery for 6-10 hrs. battery life
- Replace floppy w/ Versa Bay - Add extra PCMCIA
- Built-in 16-bit sound, microphone & speaker
- Upgradable hard drive - easily add more storage

Processor	Screen	HD	Price
Pentium 75	9.5" Active	340MB	$4349
Pentium 75	9.5" Active	540MB	4629
Pentium 75	9.5" Active	B10MB	4999
Pentium 75	9.5" High Res.	540MB	4999
Pentium 75	9.5" High Res.	B10MB	5389
Pentium 75	10.4" Active	540MB	4999
Pentium 75	10.4" Active	B10MB	5389
Pentium 75	10.4" High Res.	B10MB	5769

Versa V

- Replace floppy w/ 2nd battery for 6-10 hrs. battery life
- Upgradable hard drive - easily add more storage
- 32-bit local bus with 1MB video RAM
- 64K colors on notebook display (Active only)

Processor	Screen	HD	Price
486DX2/50	9.5" Dual Scan	250MB	$2369
486DX2/50	9.5" Dual Scan	340MB	2499
486DX2/50	9.5" Active	250MB	2889
486DX2/50	9.5" Active	340MB	3029
486DX2/50	9.5" Active	540MB	3399
486DX4/75	9.5" Active	340MB	3249
486DX4/75	9.5" Active	540MB	3779

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Ascentia 810N 4/6G 340MB 10.4" Dual $2499
Ascentia 910N 4/5G 340MB 8MB 10.4" Di...2629
Ascentia 910N 4/7S 510MB 8MB 10.4" Di...2999
Ascentia 910N 4/7S 700MB 8MB 10.4" Act.4299

digital

Hinote 486SX/33 240MB 9.5" Dual $1849
Hinote 486DX2/50 340MB 9.5" Dual 1899
Hinote 486DX2/50 240MB 9.5" Active.....2899
Hinote 486DX4/75 340MB 9.5" Active.....3299

IBM

Thinkpad Series
360 486SX/33 340MB 9.5" Mono.....$2199
360CE 486DX2/50 540MB 8.4" Active.....3229
755C 486DX2/50 540MB 10.4" Active.....3999
755C 486DX4/75 540MB 10.4" Active.....4599
750CE 486DX4/100 810MB 10.4" Active.....5099

NEC

Versa S/33D 210MB 9.5" Dual.....$1399
Versa S/33C 210MB 9.5" Active.....2179
Versa V/50C 486DX2 9.5" Active
250MB/340MB/540MB 2879/2999/3399
Versa V/75C 340MB 8MB 9.5" Active.....3399
Versa M/75C 340MB 8MB 9.5" Active.....3579
Versa M/75C 540MB 8MB 9.5" Active.....4049
Versa M/100C 340MB 8MB 9.5" Active.....4029
Versa M/100C 810MB 8MB 9.5" Active.....4679
Versa Pentium P75 540MB 8MB Active.....4549
Versa Pentium P75 B10MB 8MB Active.....4949

Texas Instruments

TM4000M SX/50 200MB 9.5" Dual $1998
TM4000M DX4/75 340MB 8.4" Active.....2979
TM4000M DX4/75 445MB 9.5" Dual 2729
TM4000M DX4/75 455MB 8.4" Active.....3249
TM5000M Pentium/75 810MB 8.4" Active ..5449

TOSHIBA

T2100 486DX2/50 280MB 4MB 9.5 Mono.$1429
T2100CS 486DX2/50 330MB 4MB 10.4" DI.2199
T2100CT 486DX2/50 330MB 8MB 8.4" Act.3049
T2400CS 486 DX2/50 320MB 4MB 9.5" DI..2423
T4800CT 486 DX4/75 500MB 8MB 9.5"Act.3499
T2150CDS 486DX4/75 500MB 4MB CD DI...3599
T2150CDT 486DX4/75 500MB 8MB CD Act.4599
T4850CT 486DX4/75 500MB 8MB 10.4"Act 3849
T4850DT 486DX4/75 810MB 8MB 10.4"Act.4049
T4900CT Pentium/75 810MB 8MB 9.5"Act .5499

PCMCIA ACCESSORIES

PRACTICAL PERIPHERALS

ProClass 14.4 PCMCIA $159
ProClass 28.8 PCMCIA 309

US Robotics

Sportster 14.4 PCMCIA $174
Sportster 28.8 V.34 PCMCIA 334

BOCA

14.4 bps Data/Fax PCMCIA.....164

COLOR MONITORS

CTX

1451ES 14" .28dp 1024x768 .....$214
1451GM 14" .28dp 1024x768 239
1562GM 15" .28dp 1280x1024 304
1565GM 15" .28dp 1280x1024 314
17BSGM 17" .27dp 1280x1024 594

MAG

DX15F 15" .28dp 1280x1024 .....$329
DX17F 17" .26dp 1280x1024 594

ViewSonic

15ES 15" .28dp 1024x768 .....$349
15G 15" .28dp 1280x1024 379
17F 17" .28dp 1280x1024 674
20G 20" .28dp 1600x1280 1279

SONY

Trinitron
CPD-15SF 15" .25dp 1280x1024 .....$424
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MITSUBISHI ELECTRONICS

Diamond Pro 15FS 15" $424
Diamond Pro 17 17" 999
Diamond Pro 21FS 21" 1979

NEC

MultiSync 2V 14" $299
MultiSync XV15 15" 429
MultiSync XE15 15" 529
MultiSync XP15 15" 624
MultiSync XE17 17" 969
MultiSync XP17 17" 1199
MultiSync XP21 21" 2429

PRINTERS

brother

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HL-655M 6ppm 300dpi 574
HL-660 6ppm 600dpi 669

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BJ-100/BJ-10SX 360dpi $204/244
BJ-200E/BJ-230 360dpi 228/399
BJC-4000 Color 360dpi 349
BJC-600E Color 720dpi 469
LBP-430 4ppm 300dpi 599
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digital

MultiJet 1000 .....$224
DECwriter 500I 284
DEC MultiJet 2000 359
DECLaser 1900 6ppm 300dpi 679
DECLaser 5100 8ppm 600dpi 1199

EPSON

Stylus 1000 360dpi 250cps.....$439
ActionLaser 1100 4ppm 300dpi 379
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Panasonic

KX-P2023 24 pin 160cps $175
KX-P2130 24 pin 250cps 199
KX-P3123 24 pin 240cps 249

Texas Instruments

Microwriter Basic 5ppm 300dpi.....$459
Microwriter PS23 5ppm 300dpi.....579
Microlaser Pro 600 PS23 8ppm 600dpi 1169
Microlaser Pro E 12ppm 600dpi 1339

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Sound Galaxy Nova 16 Extra $103
Game Galaxy Multimedia 334
Explorer Personal Multimedia 249
Explorer Deluxe 334

CREATIVE

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GameBlaster CD16 365
Digital School House 258
Edutainment Kit CD16 399
SoundBlaster Pro Value Edition 69
SoundBlaster 16 MCD 139
SoundBlaster 16 MCD ASP 169
SoundBlaster 16 SCSI-2 169
Soundblaster AWE 32 219

DIAMOND

Multimedia Kit 1000 .....$304
Multimedia Kit 4000 349
Multimedia Kit 5000 439
Sonic Sound LX 99

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Multisound Monterey 319
Multisound Tahiti 224
Rio soundcard w/playback 123

CD ROMS

NEC

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MultiSpin 2V Deluxe 282
MultiSpin 4X 369
w/SCSI Kit 489
MultiSpin 4XE 459
w/SCSI Kit 544

MicroSolutions

Backpack Double Speed $304
Backpack Quad Speed 549

SONY

CDU-55ED1 Double Speed Int. $113
CDU-7511 Double Speed Ext. 251

PLEXTOR

Plextor 4XI w/o controller $304
Plextor 4XI w/scsi controller 354
Plextor 8XI 599

TOSHIBA

XM3501 Quad Speed Ext. $394

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Graphics Pro Turbo 4MB ISA/PC/VLB.....554
WinTurbo 2MB ISA/PC/VLB 279

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SpeedStar Pro 1MB PCI/2MB PCI/VLB ..99/154
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Hayes

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Accura 14.4B Data/Fax Int.	122
Accura 28.8 V34/I/O -Fax Int./Ext.	177/209
Optima 28.8B V34/V.fC Int./Ext.	354/414

PRACTICAL PERIPHERALS

PM144HC II 14.4 Int./Ext.	$84/100
PM28BHC II 28.8 V.34 Int./Ext.	185/202

U.S.Robotics

Sportster 14.4 Data/Fax Int./Ext.	$85/108
Sportster 28.8 S/R Fax Int./V.34 Int.	216/233

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71260AT 1.2GB IDE	398

Quantum

ProDrive 420MB IDE	185
Lightning 540MB IDE	218
Lightning 730MB IDE	255

Seagate

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ST31220A 1060MB IDE	369
ST12400N 2.1G SCSI	1002
ST15150N 4.2GB SCSI	1813

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Caviar 1.0GB IDE 10ms	339

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Trakker 700 Ext.	399
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PowerTape 4GB SCSI Int.	1129
PowerTape 4GB SCSI Ext.	1359

CONNER

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Tapestor 250MB Int.	389
Tapestor 850MB Int.	255
Tapestor 850MB Ext.	389

iOMEGA

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Tape 250 Port II Ext.	279

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Etherlink III ISA BNC/RJ45	116
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The 1995 Multimedia Encyclopedia	75
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- 256K CACHE
- INTERNAL CD-ROM (Optional)
- TV TUNER MODULE (Optional)
- VESA LOCAL BUS VIDEO & LOCAL BUS IDE
- TRUE SOUND AUDIO SYSTEM
- EXTRA PORTS

NP8500

11.3" OVERSIZED MONITOR

It's easy to see the advantages of our NP8500 with oversized screen. Your graphics never looked better or moved faster. The 11.3" dual scan color VGA display is the largest screen offered on a portable — providing a viewing area that's 41% larger than the standard 9.5" screen. Which will make it easier to see your graphics speed through the high-performance 32-bit VESA Local Bus Video with Windows Accelerator. Combine this with an advanced 16-bit audio system and a double life NiMH battery and you've got a notebook that gets noticed.

- 11.3" OVERSIZED DISPLAY
- VESA LOCAL BUS VIDEO
- DOUBLE LIFE NiMH BATTERY
- TRUE SOUND AUDIO SYSTEM

NP7500

PENTIUM/486

Nothing can catch this portable when it's on the run. Our new NP7500 Pentium 90MHZ is the most advanced, highest performance notebook available today. It's also more powerful than most desktops. The Pentium CPU has twice the performance of a 486 DX-2/66 and the capability to crunch more than 100 MIPS. Add to this a 256K cache and the unsurpassed performance of VESA Local Bus Video and Local Bus IDE, and this notebook will get you where you're going fast.

- 256K CACHE
- VESA LOCAL BUS VIDEO & LOCAL BUS IDE
- BUILT-IN AUDIO SYSTEM
- PENTIUM POWER

NP9500

- Intel upgradeable 486 CPU
- 1MB Video RAM
- 32-bit VESA Local Bus Video with Windows Accelerator
- 32-bit Local Bus IDE
- 256Kb Secondary Cache
- Memory Expandable to 512Gb or 1MB
- 16-bit Stereo Audio with 2 Stereo Speakers and 1 Microphone
- 4MB RAM Expandable to 64MB
- Removable 340MB Hard Drive (520, 810MB Opt.)
- Removable 3.5" 1.44MB Floppy Drive
- Color VGA LCD Display Supports up to 640 x 480, 64K Colors CRT: 1024 x 768, 256 Colors
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- 1 Parallel Port with ECP/EPP Support
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- Jacks - 1 line in, 1 line out & 1 Microphone
- 85-Key Keyboard
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NP9500 OPTIONS

§ 25" Double Speed CD-ROM Module with MPEG or without MPEG Function
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Secondary Battery Module
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Car Adapter
Numeric Keypad
Docking Station
PCMCIA Cards

NP8500

- 11.3" Dual Scan Color VGA Display CRT: 1024x768, 256 colors
- Intel Upgradeable 486 CPU
- 1MB Video RAM
- 32-bit VESA Local Bus Video with Windows Accelerator
- 16-bit Stereo Audio with 2 Stereo Speakers & 1 Microphone
- 4MB RAM Expandable to 20MB
- Removable 340MB Hard Drive (520, 810MB Optional)
- 3.5" 1.44MB Floppy Drive Replaceable with 2nd battery pack
- Simultaneous CRT & LCD Operation
- Integrated Pointing Device
- Intelligent Power Management w/ SMM
- 2 PCMCIA Type I & II or 1 Type III Slots
- Extra Long Life NiMH Battery
- 1 16C550 Compatible Serial Port
- 1 Parallel Port with ECP/EPP Support
- Other Ports: Ext. Keyboard, Ext. VGA Monitor & 200 Pin Connector for Docking Station
- Jacks - 1 line in & 1 line out
- 86-Key Keyboard
- Microsoft DOS 6.22
- Carrying Bag & AC/Adapter
- Weight 5.9lbs. with Battery
- 11.81"W x 9.64"D x 1.65"H
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NP8500 OPTIONS

Docking Station
Numeric keypad
Car Adapter
PCMCIA Cards
(Fax/Modem, Ethernet, SCSI & more)

NP7500

Pentium:

- 256KB Secondary Cache
- 8MB RAM Expandable to 40MB
- 1 16C550 Compatible Serial Port
- 1 Parallel Port with ECP/EPP Support
- Color VGA LCD Display Supports up to 640 x 480, 64K Colors

486:

- 4MB RAM Expandable to 36MB
- 1 Serial & 1 Parallel Port

- 1MB Video RAM
- 32-bit VESA Local Bus Video with Windows Accelerator
- 32-bit Local Bus IDE
- 16-bit Stereo Audio with 2 Stereo Speakers & 1 Microphone
- Removable 340MB Drive (520, 810MB Optional)
- 3.5" 1.44MB Floppy Drive
- Color or Mono VGA Display CRT: 1024x768, 256 Colors
- Simultaneous CRT & LCD Operation
- Large Built-In 19mm Trackball and Hand Rest
- Intel Upgradable CPU
- Intelligent Power Management with SMM
- 2 PCMCIA Type I & II or 1 Type III Slot
- Super Long Life NiMH battery
- Other Ports: Ext. keyboard, Ext. VGA monitor, & 200 Pin Connector for Docking Station
- Jacks - 1 line in & 1 line out
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486DX2-66	$1675	$2075	$2625	$2845
486DX4-75	$1745	$2145	$2695	$2925
486DX4-100	$1795	$2195	$2745	$2975

NP8500	11.3" COLOR DUAL SCAN
486DX2-66	$1895
486DX4-75	$1975
486DX4-100	$2025

NP7500	9.5" MONO	10.3" COLOR DUAL SCAN	9.5" COLOR ACTIVE MATRIX
486DX2-66	$1475	$1845	$2425
486DX4-75	$1545	$1925	$2495
486DX4-100	$1595	$1975	$2545
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ST31722A	1.7GB	10MS	IDE	1
ST31640N	1.6GB	10MS	SCSI	1
ST31230N	1.2GB	10MS	SCSI	1
ST3660A	660MB	12MS	IDE	1
ST3660N	660MB	12MS	SCSI	1

SCSI-SURROUNDING - 7200 RPM

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MC3540A	2.54GB	8.5MS	5400 RPM	1049
MC3420A	2.1GB	8.5MS	5400 RPM	1049
MC3420A	2.1GB	8.5MS	5400 RPM	1049
MC3210A	1.2GB	8.5MS	5400 RPM	1049
MC3210A	1.2GB	8.5MS	5400 RPM	1049
MC3105A	1.0GB	8.5MS	5400 RPM	1049
MC3105A	1.0GB	8.5MS	5400 RPM	1049
MC3105A	1.0GB	8.5MS	5400 RPM	1049
MC3105A	1.0GB	8.5MS	5400 RPM	1049

IBM

WHMH2A0ESCS	2.0GB	8MS	5400 RPM	650

Seagate

ST31640A	1.6GB	10MS	5400 RPM	1072
ST3660A	660MB	12MS	5400 RPM	1072
ST3660N	660MB	12MS	5400 RPM	1072
ST3660A	660MB	12MS	5400 RPM	1072

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QL3540A	540MB	12MS	5400 RPM	1072
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Jumbo 250 int/ext	250MB	1072
Jumbo 250 int/ext	250MB	1072
Trakker 600 int/ext	600MB	1072
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ELSA

ELSA Gloria 1MB VLB	1MB	199
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Conner

CFP1060S	1.0GB	11MS	5400 RPM	1072

Seagate

ST32550W	2.0GB	8MS	7200	1
ST32550W	2.0GB	8MS	7200	1

MICROPOLIS

3243DC	3.24GB	7.4MS	7200	1
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ST32550W	2.0GB	8MS	7200	1

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387SX-50	99	387DX-80	99	387SX-40	99	387SX-66	99
387SX-66	99	387DX-100	99	387SX-50	99	387SX-80	99
387SX-80	99	387DX-120	99	387SX-66	99	387SX-100	99
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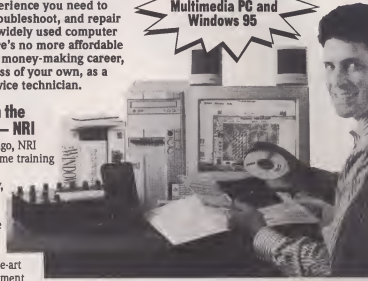

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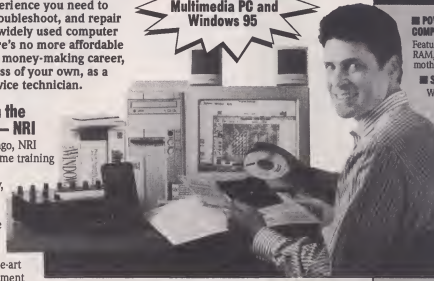

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4Meg4 (3.3V)	16 Mb	32 Mb	64 Mb	128 Mb
4Meg4 (3.3V)	16 Mb	32 Mb	64 Mb	128 Mb
4Meg9	16 Mb	32 Mb	64 Mb	128 Mb
4Meg9 (3.3V)	16 Mb	32 Mb	64 Mb	128 Mb
16Meg4 (3.3V)	64 Mb	128 Mb	256 Mb	512 Mb
16Meg4 (3.3V)	64 Mb	128 Mb	256 Mb	512 Mb
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4 Meg x 36 / 8 bk	649.00	1249.00	2449.00	-	-
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64G5060 (81129638414606681695789005144064Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5061 (162259276829213363391578010288128Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5066 (5192296858534827628530496329220096Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5071 (166153499473114484112975882535043072Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5072 (332306998946228968225951765070086144Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5074 (1329227995784915872903807060280344576Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5086 (5444517870735015415413993718908291383296Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5087 (10889035741470030830827987437816582766592Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5088 (21778071482940061661655974875633165533184Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5089 (43556142965880123323311949751266331066368Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5091 (174224571863520493293247799005065324265472Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5092 (348449143727040986586495598010130648530944Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5093 (696898287454081973172991196020260297061888Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5098 (22300745198530623141535718272648329505980416Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5099 (44601490397061246283071436545296659011960832Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5100 (89202980794122492566142873090593318023921664Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5102 (356811923176489970264571492362373272095686656Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5120 (93536104789177786765035829293842113257979682750464Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5121 (187072209578355573530071658587684226515959365500928Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5123 (748288838313422294120286634350736906063837462003712Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5124 (1496577676626844588240573268701473812127674924007424Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5125 (2993155353253689176481146537402947624255349848014848Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5132 (383123885216472214589586756787577295904684780544900544Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5140 (98079714615416886934934209737619747591299823819750539264Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5141 (196159429230833773869868419475239495182599647639501078528Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5142 (392318858461667547739736838950478990365199295279002157056Meg)	64-802 64-901 64-A01 64-B01	1499.00
64G5143 (784637716923335095479473677900958302187198590558004314112Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5159 (51422017416287688817342786954917203280710495801049370729644032Meg)	64-802 64-901 64-A01 64-B01	1499.00
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64G5162 (411376139330301510538742295639337626245683966408394965837152256Meg)	64-802 64-901 64-A01 64-B01	1499.00
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576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600

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651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675
676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725
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751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775
776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825
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851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875
876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

Please answer questions below:

1. Where do you use your computer? (Check one only):
A. ☐ Home B. ☐ Business C. ☐ Both

2. What kinds of computers do you use? (Check all that apply):
D. ☐ IBM/Compatible Laptop E. ☐ IBM/Compatible Desktop F. ☐ MAC

3. Do you plan to buy any of the hardware or software mentioned below in the next 12 months?
(Check all that apply):

HARDWARE
G. ☐ PC
H. ☐ MAC
I. ☐ Laptop
J. ☐ Printer
K. ☐ Monitor
L. ☐ Disk/Tape Back-up
M. ☐ Add-in Board
N. ☐ Modem
O. ☐ Input Device
P. ☐ Local Area Network

SOFTWARE
Q. ☐ Accounting
R. ☐ Spreadsheet
S. ☐ Personal Finance
T. ☐ Desktop Publishing
U. ☐ Word Processor
V. ☐ Database Manager
W. ☐ Graphics
X. ☐ Utility
Y. ☐ Communications
Z. ☐ Windows/Multi-tasking
1. ☐ Programming Language/ Compiler
2. ☐ Integrated/Multifunction
3. ☐ CAD
4. ☐ CD-ROM
5. ☐ On-Line Services

4. From which of the following sources do you purchase personal computer products?
(Check all that apply):
5. ☐ Specialty Computer Retail Stores
6. ☐ Mail Order Firms
7. ☐ Direct from Manufacturers
8. ☐ Other

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6. ☐ Please send me a one-year (12 issue) subscription to PC/Computing for $16.97 (U.S. price), all other countries add $16.00 for additional postage.

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H. ☐ MAC
I. ☐ Laptop
J. ☐ Printer
K. ☐ Monitor
L. ☐ Disk/Tape Back-up
M. ☐ Add-in Board
N. ☐ Modem
O. ☐ Input Device
P. ☐ Local Area Network

SOFTWARE
Q. ☐ Accounting
R. ☐ Spreadsheet
S. ☐ Personal Finance
T. ☐ Desktop Publishing
U. ☐ Word Processor
V. ☐ Database Manager
W. ☐ Graphics
X. ☐ Utility
Y. ☐ Communications
Z. ☐ Windows/Multi-tasking
1. ☐ Programming Language/Compiler
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NEVADA COMPUTER

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1MX36		$144	
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1MX36 4MEG		$148	$176
2MX32			$199
2MX36 8MEG		$302	$328
4MX32			$379
4MX36 16MEG		$516	$528
8MX32		$516	$528
8MX36 32MEG		$1,111	$1,175
16MX36 64MEG			$2,875

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80486 SX/33	$99
80486 DX/25	$139
80486 DX/33	$158
80486 DX/50	$178
80486 DX2/50	$249
80486 DX4/75	$258
80486 DX4/100	$298
80486 DX4/100	$298
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PENTIUM 66	$398
PENTIUM 90	$596
PENTIUM 100	$699
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256 X 1	$1.85	$2.40	$3.00	$3.10
64K X 4		$5.45	$5.75	$6.45
1MEG X 1	$4.90	$4.90	$5.75	$6.45
4MEG X 4			$24.00	$24.00
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256K X 9 (PAR CAS)				$39.00

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80387-20MHz	$38
80387-25MHz	$38
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80387DX	$74
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80387SX/20	$49
80387SX/25	$67
80387SX	$79

80386 MACHINES:

80827-16MHz	$38
80827-18MHz	$48
80827-20MHz	$49

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80287-8MHz	$48
80287-10MHz	$49
80287-12MHz	$49
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8K/32		5.95	5.95	5.95
64K/8				
64K/32	16.95	7.05	6.95	
128K/32	10.00	7.95	6.95	
256K/32		6.95	6.45	5.95
128K/8		14.00	14.00	12.00

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Toshiba Memory

MODEL	MEMORY	PART#	PRICE
T1000 SLE&SX	1MB	FAB31 LU	$21
T1000 SE/LV/XE	2MB	FAB32 LU	$73
T2000 / T2000SX	2MB	FAB31TU	$73
T3000SX/T1000 LE	2MB	FAB32 LU	$73
	4MB	FAB32 LU	$146
T1200 XE	2MB	PA3084U	$98
T600	2MB	PA3031U	$86
T3000 SX/T2000SX/T1900 T1850C			$58
	2MB	PA3000U	$78
	4MB	PA3001U	$156
	8MB	PA3002U	$312
T2400, T3400, T1600 F.V	4MB	PA3019U	$158
	8MB	PA3020U	$316
	16MB	PA3021U	$790
T3100	2MB	PA3152E	$138
T3100 LE	2MB	PA3151E	$138
T3100 SX	2MB	PA3008U	$108
	4MB	PA3010U	$188
T3200 SX	2MB	PA3077U	$118
	4MB	PA3078U	$236
T3200 SXC	2MB	PA3118U	$169
	4MB	PA3119U	$338
T3300SL	2MB	PA3175U	$188
	4MB	PA3176U	$376
	8MB	PA3177U	$752
	16MB	PA3178U	$1504
T4400SX	4MB	PA3009U	$258
	8MB	PA3011U	$516
	16MB	PA3012U	$1032
T4400, T4600 T1900C	4MB	PA3013U	$190
	8MB	PA3014U	$380
T5100	8MB	PA3016U	$359
T5200/T5200C/T8500/T5400	4MB	PA3045U	$189
	8MB	PA3136U	$378

IBM Memory

MODEL	MEMORY	PART#	PRICE
ARMDA Enterprise 486, Hurricane 486, Spinnaker 486	2MB	N/A	$92
	4MB	N/A	$184
AMBRA Enterprise 486, Hurricane 486, Spinnaker 486	4MB	92F0102	$198
	16MB	92F0103	$790
PS/1 and 386SX (1/21)	2MB	92F9925	$90
	4MB	92F9604	$190
PS/2 30/286,25/286, Aapp Ext 4/95MB, 34F3811 / 34F3577, 552, 555X, 65SX,X PS/	2MB	34F3576	$78
	4MB	34F3577	$156
	8MB	34F3582	$312
PS/2 25SX, L5, 40SX,70-E61, 56, 76, 121, Aapp Ext 4/95MB, 34F3811 / 34F3577, 552, 555X, 65SX,X PS/	2MB	34F3576	$78
	4MB	34F3577	$156
	8MB	34F3582	$312
PS/2 50, 50Z, 55SX, 60 65SX, 2.8MB 14F3139	2MB	14F3139	$96
	8MB	14F3649	$368
PS/1 Consultant Essentials & Expert models w/32 x64 & PS/Viewsonic all models except Color Series	4MB	84F9290	$184
	16MB	84F9291	$736
PS/2 70-A21, A41 P21, 56s/ PS/1 Consultant, Essential & Expert models w/1, w/2 & w/4 MODEMS	2MB	14F3139	$96
	8MB	14F3649	$368
PS/2 30SX-15 40SX 55SX, L5, 40SX	2MB	14F3139	$96
	8MB	14F3253	$198
PS/2 90 XP 90 XP FPS (Pkg) 34 57 (Pkg) 76 77	2MB	34F3253	$198
PS/1 Pro 2122	2MB	64H5901	$88
PS/2 90, 95 XP FPS (Pkg) 34 57 (Pkg) 76 77	4MB	34F3577	$156
Essential Expert x41 x42 & x44 PS/1 Pro 2122, 42	8MB	34F3582	$312
4860	4MB	64H3130	$158
	8MB	64H3131	$258
PS/2 P70 80 A21, A31, A61	4MB	64H3129	$158
PS2, 70's and 80's	2MB	64H3405	$237
32 BIT BOARDS	2.4MB	34F3077	$225
32 BIT BOARDS	4.8MB	34F3078	$450
PS/2 80-A21, A31, A41	4MB	64H3560	$188
PS/2 80-041	2MB	64H3571	$78
PS/2 80-111 311, 121, 321 001, 16L	4MB	64H3579	$156
	8MB	64H3580	$312
4610 ROS/4680/4690 (4MB) 4694 (4MB) 4694/4695			$198
			$378

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MODULE	1MB	2MB	3MB	4MB	5MB	6MB
HP LaserJet 4						
HP LaserJet 4 Plus		$118	$164			
Canon LBP-430		$128	$238			
Epson Action Laser 1000	$88		$196	$308		
Epson + 6000 and comp mem		$128	$198			
Epson EPL-7000 Laser 1000 & 1500		$98		$188	$299	
Fujitsu 7100 & 7200		$179	$279			
HP DeskJet 500, 500C, 510, 550C		$38	($56)			
HP 2, 2D		$98	$164			
HP 3, 3Si, 3P, 3P						
HP LaserJet 4, 5, 4L, 5L, 5000, 5MP		$84	$148	$316		
IBM Laser 4019						
IBM LaserPrinter		$114	$164			
IBM Laser 4029		$93	$135			
NEC SilentWriter LC 890		$104				
NEC 90		$68	$88			
QMS 1000		$68	$88			
Panasonic KX-P4410		$123		$238		
Panasonic 4410/4420		$118		$174		
Panasonic 4420/4430		$118		$178		
Panasonic 4400/4450		$139		$198		
Panasonic 4400/5400		$139		$196		
QMS 410 PS		$119	$159	$249		
Toshiba Page Laser 6		$79		$168		
TI OLUPRO/PS35		$44	$98			

IBM Laptop Memory

ThinkPad 300 Series Main	2MB	33L3000	$198
ThinkPad 350, 350C, 360	2MB	33L3001	$198
ThinkPad 500	2MB	33L3002	$198
ThinkPad 500, 500CS, 560	4MB	33L3003	$396
	8MB	33L3004	$792
ThinkPad 700, 700C, 750, 750C, 750P	4MB	33L3005	$396
	8MB	33L3006	$792
	16MB	33L3007	$1584
ThinkPad 710T	4MB	33L3008	$396
	8MB	N/A	$792
ThinkPad 720, 720C	4MB	33L3009	$396
	8MB	33L3010	$792
Laptop 700CD, 700CS, 720CD, 720CS	4MB	33L3011	$396
	8MB	33L3012	$792
	16MB	33L3013	$1584
Laptop 750CD, 750CS, 750C, 750P	4MB	33L3014	$396
	8MB	33L3015	$792
	16MB	33L3016	$1584
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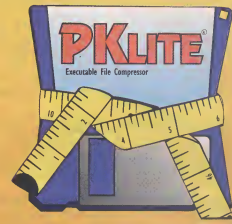

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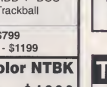

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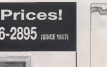

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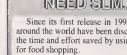

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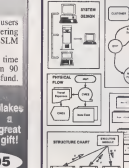

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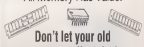

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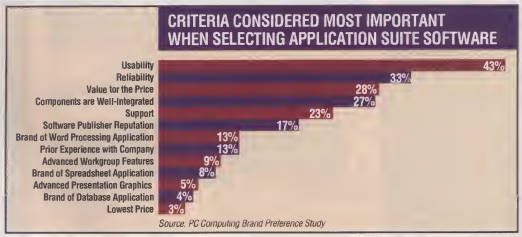
Software Watch 95

Your update on software trends and product advertising.

Hitting the Suite Spot

The choice is yours: Do you buy your applications individually or do you by them bundled in a suite of applications? The advantages of buying your applications individually include buying only the applications you need or want, sticking with the applications you know and trust, and maintaining a feeling of free choice and independence (that's one of the things that attracted us to personal computers, wasn't it?). On the other hand, suites are cheap and they tend to work well together. Or, you can always purchase the suite for the two or three applications that appeal to you (it's still cheap), and you can still use that Visicalc program that's become as much a part of your personal identity as that bathrobe your wife keeps trying to get you to retire.

The benefits of suites have users lining up to buy the latest packages. According to Dataquest, Microsoft Office generated more revenue worldwide than any other PC productivity software. The robust sales of applications software suites is also reflected by many of PC Computing's subscribers. When asked about purchase plans for software products, 33% of you recently indicated that you planned to purchase software applications suites in the next 12 months. And when asked, in another recent survey, which criteria were most important to you when selecting a particular brand of application suite software, your priorities were clear: usability, reliability and value for the price (not lowest price) ranked highest among all criteria.



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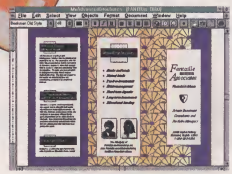

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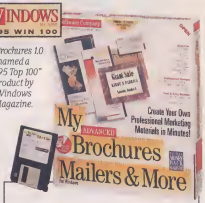

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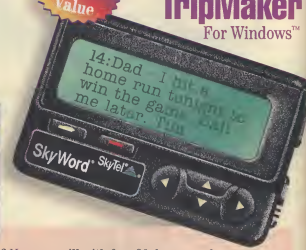

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I-Way Patrol

Online Human Resources, ImagiNation, Starwave Web Site

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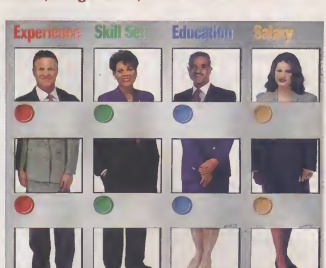

Net Vocation: Online employment resources are making the traditional job search a thing of the past.

Whether you're unemployed, recently graduated, polishing up that résumé for a career change, or recruiting the best and brightest to fill a mission-critical position, you'd be remiss not to take advantage of online employment resources. Pounding the digital pavement is now easier than ever, and as online employment resources grow, the traditional job search is fast becoming a thing of the past.

Commercial online services such as America Online and CompuServe have been offering employment-related forums for years. Once limited to listings of technical and computer-related jobs, they're rapidly expanding to include a multitude of career options, from nursing, sales, and marketing to educational, industrial, and service-oriented positions. But while these commercial services have a lot to offer, nothing can match the explosion of employment pages now occurring on the World Wide Web.

CareerMosaic (http://www.careermosaic.com) is an online head-hunting pioneer run by Bernard Hodes Advertising that specializes in career recruitment and human resource services. You'll find nearly 40 companies—including Sprint and Price Waterhouse—looking for a few good people. There's also a College Connection specifically tailored to new graduates.

CareerTaxi (http://www.iquest.net/Career_Taxi/taxi.html) is another innovative employment-related Web page, where you can enter Job City, search the Job Expressway, find job openings with companies like Motorola, and make a pit stop at the Cafe for advice.

In addition, both CareerMosaic and CareerTaxi include hypertext links to other online employment sites. A number of these sites is listed below.

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You read the want ads, but you still can't find a job. Have you tried searching online?

AMERICA ONLINE Help-Wanted USA and worldwide listings through E-Span Database (Keyword: JOBS).

CAREERMOSAIC Great job resource (http://www.careermosaic.com).

MEDSEARCH AMERICA Health-related positions (http://www.medsearch.com).

CAREER MAGAZINE Job openings, interactive discussion groups, and articles (http://www.careermag.com/careermag/).

AMERICA'S JOB BANK Focuses on government and government-related jobs, but also links to other job banks on the Web (http://www.ajb.dni.us).

PRODIGY Careers Bulletin Board and Careers Classifieds have extensive job listings (Jump: CAREER OPPORTUNITIES).

COMPUSERVE Offers job searching through E-Span and dozens of related forums (Go: CLASSIFIEDS).

DELPHI Features the Business Forum with classified ads, as well as the Job Complex and the Self-Employment Forum.

THE MONSTER BOARD It's all about empowerment, so you get real-time access to information, employers, and jobs (http://www.monster.com).

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I-Way Patrol

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A VERY JEALOUS DOGBERT Dilbert of the Day, Dilbert newsletters, a graphical prehistory of Dilbert, and rare Scott Adams memorabilia at the "official" Dilbert page.
http://www.unitedmedia.com/comics/dilbert

PAUL ALLEN'S TRIPLE SHOT

Starwave's home page includes Mr. Showbiz, an entertainment magazine with moving parts, and SportsZone, one of the most comprehensive sport sites anywhere on the Web.
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TREKKIES DELIGHT You're in sick bay aboard the *U.S.S. Voyager*. You've been unconscious since it went to search for the Maquis's ship. Join a mission on Paramount's Star Trek Voyager.
http://voyager.paramount.com

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http://www.addict.com/ATN/

URBAN DESIRES This is a slick interactive Web 'zine of metropolitan passions, from music and art to personalities and food.
http://desires.com/ud.html

Contributors: DANIEL CARWIN, MATTHEW LAKE, CLEMENTINE OLIVER.
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Patrick Vincent's Free Stuff from the Internet has hundreds of links to even more free stuff.
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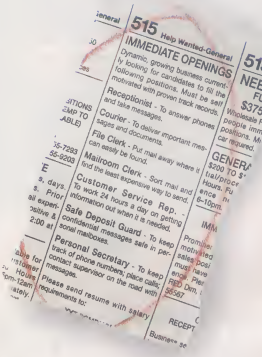

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1. Call CompuServe at (800) 848-8199 for a local access number.

2. Set your software to 7 data bits, even parity, 1 stop bit, full duplex, and dial the service.

3. Press Ctrl-C to get the system's attention, and at the HOST NAME prompt, type CIS and press Enter.

4. For USER ID, type 177000,5300, and at the PASSWORD prompt, type PC/CONTACT.

5. At the ENTER AGREEMENT NUMBER prompt, type PCC95.

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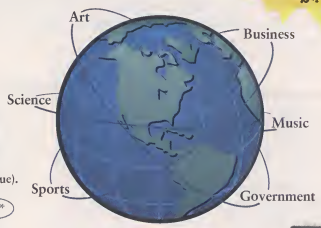

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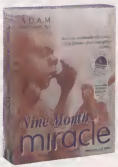

Imagine a spectacular journey inside the body as you witness the development of a new life. A faint heartbeat. The wide eyes. The tiny fingers and toes. A kick. Then, the first breath. Conception to birth, and everywhere in between.

A learning tool for the entire family, Nine Month Miracle is the multimedia experience of a lifetime! Unlock the mysteries of twins. Watch the amazing changes as the baby's face develops. Share the real-life joys and concerns of expectant parents, captured on video. Get the latest information from experts at the American College of Obstetricians & Gynecologists. And much more.

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Circle 261 on reader service card.

All Aboard!

Oh, the call of the open road! Every summer it beckons like a blue-light sale at Kmart. The thrill of newly discovered places! The excitement of the sound of foreign tongues—and the cab driver isn't even halfway to the airport yet! If the open road calls, take its number and return the call using these CDs with wheels.

Body Language: Berlitz teaches more than just words and phrases.

BERLITZ, LIVE! ●●●●●

Lots of CD-ROMs can help you find your way, but not many help you get the job done once you get there. Berlitz's language programs—one each for Japanese and Spanish—double as training for doing business in foreign lands. The language instruction emphasizes business phrases, and you learn the body language of each country as well, such as Japan's ritual bowing during the exchange of *meishi* (business cards). Even if you have no intention of learning Japanese, these business tips are invaluable. And the language lessons themselves are clever. The lip-synched animated instructors who guide you are particularly impressive. These are first-rate educational *and* business CDs, all around.

Berlitz, Live! Japanese and **Berlitz, Live! Spanish** / Sierra On-Line / (800) 757-7707, (206) 649-9800 / $135 each est. street price / *Reader Service No. 711*

MICROSOFT AUTOMAP ROAD ATLAS ●●●●

Route-planning CD-ROMs for the most part were written for family vacations with Junior and Sis in the backseat wishing they were back home with their friends. But the business traveler, especially one covering a small territory by car, can also benefit from some of the maps, driving instructions, and travel guides contained on the best of these disks. Longer trips, however—like the one I planned from San Antonio to San Francisco—make CD-ROM maps stumble.

The biggest advantage of Microsoft Automap Road Atlas is its wizards, which guide you through the program. The disc also gives you enough control to customize maps with the information you find most helpful, such as where you're going to need gas and the locations of attractions en route. But don't overdo it; it's easy to wind up with so many city and attraction names, highway signs, and assorted other markers that you can't see the highway you're supposed to travel.

Y' Cain Get There from Heah! Get from point A to point B, CD-style.

Microsoft Automap Road Atlas / Microsoft / (800) 426-9400, (206) 882-8080 / $60 est. street price / *Reader Service No. 712*

AAA TRIP PLANNER ●●●

Like the much praised Taxi CD-ROM, AAA Trip Planner provides detailed information on restaurants and hotels. But unlike Taxi, Trip Planner isn't limited to a few cities. It details dozens of places, even mid-sized towns. But I was surprised at how bad its maps are. After all, this is AAA.

Use Trip Planner for its database of dining and lodging. If you have to drive, use one of the other programs for mapping.

AAA Trip Planner / Compton's NewMedia / (800) 284-2045, (619) 929-2500 / $39 est. street price / *Reader Service No. 713*

MAP 'N' GO ●●●

Map 'n' Go is an all-around decent CD. It doesn't have much detail on hotels and restaurants, but it has the basics, as well as videos and photos of attractions if you need help deciding where to go. The controls are good: You can tell it to avoid state highways, toll roads, or any other routes you don't like. But its real star could be the zoomed-in strip maps that break a road trip into several maps. Map 'n' Go prints instructions and labels for roadside attractions on either side of the map strips. Only two problems: The program breaks the route into too many maps for long trips—59 to get from San Antonio to San Francisco—and it prints them off-center so that you often can't see the route.

Map 'n' Go / DeLorme Mapping / (800) 452-5931, (207) 865-1234 / $39 est. street price / *Reader Service No. 714*

●●●●● *Winter on the Riviera.* ●●●● *With the kids at Epcot.* ●●● *Summer in New York City.* ●● *One week in Akron, Ohio.* ● *Two weeks in Akron, Ohio.*

PHOTOGRAPH BY JAMES McGOON

RAND MCNALLY TRIPMAKER ○○○○

All the travel planners are slow to print, but each handles the printing of maps differently. Where Microsoft Home Automap prints the entire route on one sheet, followed by pages of instructions, Rand McNally Tripmaker takes the better approach. It breaks the route into one map for each day of driving (although the first day of my trip left me stranded in the West Texas desert). Tripmaker's maps give you just enough helpful detail, and it has wizards to guide you through the program.

Rand McNally Tripmaker / Rand McNally / (800) 671-5006, (708) 329-8100 / $49 est. street price / *Reader Service No. 715*

EXPERT TRAVEL PLANNER CD ○

Expert Travel Planner CD's list of tourist attractions names San Antonio's coliseum—home of the city's annual cow show—but overlooks the Alamo entirely. Yep, that's right. They *forgot* the Alamo.

Expert Travel Planner CD / Expert Software / (800) 759-2562, (305) 567-9990 / $15 est. street price / *Reader Service No. 716*

MULTIMEDIA BUSINESS 500 RELEASE 2 ○○○○○

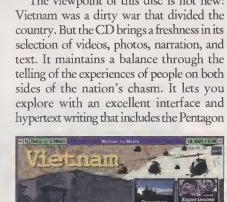
Yes! This is exactly what more CD-ROMs should be doing. The first release of Multimedia Business 500 made *PC Computing*'s list of top business discs because of the depth of its information on the country's 500 biggest public companies. Graphs make quick sense of the numbers, and videos show the companies' products and operations. These features alone make Multimedia Business 500 pay off big among Windows business CDs. But all the information crammed onto the disc is static; months from now it could change drastically. So here comes the good part: Multimedia Business 500 comes with a Prodigy membership and software that lets you access up-to-date data on all 500 companies. I wish the connection to Prodigy were more integrated with the disc—ideally you shouldn't have to know where the information is coming from—but we'll get there.

Multimedia Business 500 Release 2 / Allegro New Media / (800) 424-1992, (201) 808-1992 / $48 est. street price / *Reader Service No. 717*

VIETNAM ○○○○○

A video of the Vietnam War Memorial is playing when suddenly there's no sound. How can they get away with no audio? Because the effect works. When the topic is the Vietnam War, pizzazz is inappropriate. Silence is eloquence as the video shows the names of those who died for a thankless cause. Elsewhere, when the CD does use a soundtrack, it's eerily effective—especially when the chanting of protesters blends into the noise of a chopper flying overhead.

The viewpoint of this disc is not new: Vietnam was a dirty war that divided the country. But the CD brings a freshness in its selection of videos, photos, narration, and text. It maintains a balance through the telling of the experiences of people on both sides of the nation's chasm. It lets you explore with an excellent interface and hypertext writing that includes the Pentagon



Hell No, We Won't Go! Click here for a powerful look at a serious subject.

Papers. And it keeps the war in perspective with a time line. There still must be something to be learned from the Vietnam war, and this is a good place to pick it up.

Vietnam / Medio Multimedia / (800) 788-3866, (206) 867-5500 / $35 est. street price / *Reader Service No. 718*

THE JOY OF SEX ○○

All right! I don't want to hear a snicker out of anyone, not even when I mention that this CD uses expressions like "the shocking fuzz of your electric fur." As a best-selling book by Dr. Alex Comfort, *The Joy of Sex* was an honest guide to the new sexuality. Today it looks almost quaint compared to, say, Saturday night on HBO. The CD loses specifics in the glow of promoting sex with a smile, and it needs an update to include AIDS and a better interface with search capabilities.

I'll be honest. I'm a pretty free-thinking kind of guy. But there's something disconcerting about seeing illustrations from the book on a 17-inch monitor while a woman talks through my multimedia speakers about orgasm. Some things work better between the covers . . . of a book. Fortunately, the book is included with the CD if you too get embarrassed.

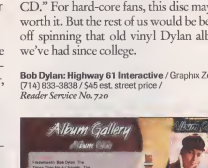
The Joy of Sex / Philips Media / (800) 340-7888 / $60 est. street price / *Reader Service No. 719*

BOB DYLAN: HIGHWAY 61 INTERACTIVE ○○○

At first it seems to be an unlikely marriage: the finest reclusive folk musician of the century combined with the future of communications, a multimedia CD-ROM. Well, sometimes first impressions are right.

The "virtual reality" interface is clever where it should be clear, and stingy where it should be generous. The result is that the disc is as secretive and quirky as Bob Dylan himself. There are pockets of interesting biography and performance videos, and the Sphinx-like interface tries to make getting there half the fun. It isn't. Getting fancy is OK—so long as you provide shortcuts for those who want to be there now. I kept hoping that I would stumble upon a single button labeled "Play all the music on the CD." For hard-core fans, this disc may be worth it. But the rest of us would be better off spinning that old vinyl Dylan album we've had since college.

Bob Dylan: Highway 61 Interactive / Graphix Zone / (714) 833-3838 / $45 est. street price / *Reader Service No. 720*



How Many Roads . . . ? And how many clicks to discover Dylan?

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Technolust

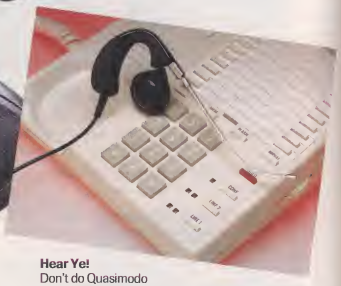
Rest Those Eyes, Relax Those

BY JAMES OLIVER CURY AND MATTHEW LAKE

You're traveling to another dimension, a dimension not only of wrist ache and eyestrain but also of relief. It's a journey to a wondrous land whose boundaries are that of ergonomics. Read the signpost ahead: Relief in Sight. Your next stop? The Comfort Zone.

Pull up a Chair: Throw out that piano stool you've been using at your workstation. Your first step into the Comfort Zone should be sitting down in the right chair. Herman Miller's Aeron Chair is just such a heinie rest—adjustable where it needs to be and supportive in the right places, with ventilation and an award-winning design (so it's not an eyesore). Don't leave an upright position without it.

Aeron Chair / Herman Miller / (800) 851-1196 / $800 to $1,200 list (depending on configuration and quantity) / *Reader Service No. 726*

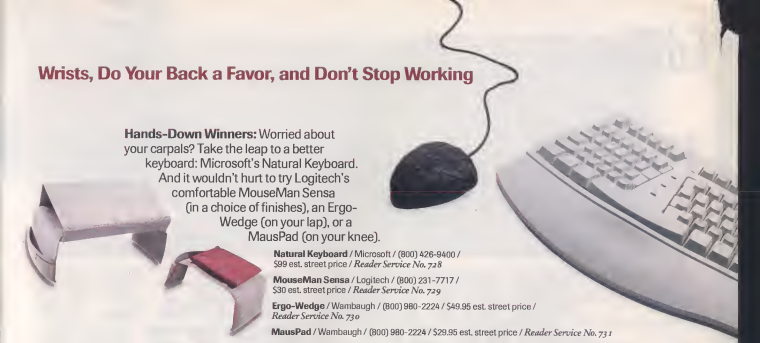


Hear Ye!
Don't do Quasimodo impersonations by cradling your phone against your shoulder. Get a headphone and matchbox-sized adapter like CompuSet. It's tiny (cutting down on the air traffic controller remarks from coworkers) and sounds clear.

CompuSet / Plantronics / (800) 544-4660 / $220 est. street price / *Reader Service No. 727*

PHOTOGRAPHY BY STEVEN LINDERWOOD

Wrists, Do Your Back a Favor, and Don't Stop Working



Hands-Down Winners: Worried about your carpals? Take the leap to a better keyboard: Microsoft's Natural Keyboard. And it wouldn't hurt to try Logitech's comfortable MouseMan Sensa (in a choice of finishes), an Ergo-Wedge (on your lap), or a MausPad (on your knee).

Natural Keyboard / Microsoft / (800) 426-9400 / $99 est. street price / *Reader Service No. 728*

MouseMan Sensa / Logitech / (800) 231-7717 / $30 est. street price / *Reader Service No. 729*

Ergo-Wedge / Wambaugh / (800) 980-2224 / $49.95 est. street price / *Reader Service No. 730*

MausPad / Wambaugh / (800) 980-2224 / $29.95 est. street price / *Reader Service No. 731*

Toe-Tappin', Finger-Clickin' Good: For that total-body typing workout, why not bring your feet in on the act? You can program Bilbo's three foot pedals to be your Tab, Shift, or function keys—or even to trigger a macro. And if you're tired of using a regular mouse, use Logitech's sleek phaser-on-stun Trackman Live wireless pointer—ideal for presentations.

Step On It Keyboard Control Pedals / Bilbo Innovations / $89 est. street price / (800) 203-0092 / *Reader Service No. 732*

TrackMan Live / Logitech / $149 Street / (800) 231-7717 / *Reader Service No. 733*

Feast Your Eyes: For a break, push back your ergonomic chair and watch some high-resolution TV—courtesy of Tecmar's PCTV—on NEC's MultiSync XP21 monitor. To justify the break, try a few WorkSmart exercises (onscreen).

MultiSync XP21 / NEC Technologies / $2,580 est. street price / (800) 632-4636 / *Reader Service No. 734*

PCTV / Tecmar / $455 est. street price / (800) 422-2587 / *Reader Service No. 735*

WorkSmart Stretch Software / Ergodyne / (800) 225-8238 / $39.95 est. street price / *Reader Service No. 736*

Ed Bott

Bug Busters

The Official Story: As you install the Preview version of Windows 95, pay attention to the seemingly endless series of promotional screens and Microsoft ads that flash by. One offers the following breathless promise: "What you do now will be easier and faster. What you want to do is now possible. Whatever you do will be more fun."

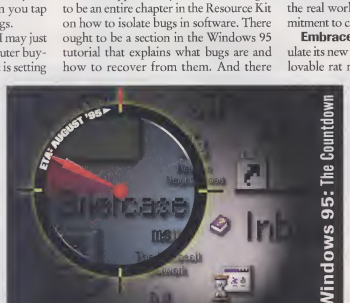
The Inside Story Is computing easier with Windows 95? Faster? More fun? Sure, until your mouse pointer suddenly locks up, or your sound card starts chattering like a chipmunk on Ritalin, or your system simply ignores you when you tap on the keyboard. Blame it on bugs.

Bugs are a fact of life. You and I may just shrug and reboot, but new computer buyers will raise holy hell. Microsoft is setting itself up for a Pentium-size PR disaster if it doesn't figure that out soon. For the millions of unsophisticated computer users who will start using Windows 95 later this year, the "fast, easy, fun" mantra establishes a level of expectation that no piece of software can ever meet. If I ran the Windows 95 PR effort, I'd turn those bugs into an overwhelming competitive advantage. Here's how.

Acknowledge that bugs exist. It's a simple syllogism: All software has bugs. Windows 95 is software. Therefore, despite Microsoft's best efforts, the retail version of Windows 95 will contain lots of itsy-bitsy bugs, a few medium-size pesky bugs, and maybe one or two nasty ones that will surface on one in 10 million PCs.

Is this bad? If you're the one in 10 million, you'll wonder who picked you to be the poster child for the Law of Averages. (Why couldn't you have hit the lottery instead?) But even a garden-variety bug can lead to ulcers if it eats your data while you're racing toward a tight deadline.

Search through the Windows 95 help files and you will find not a single mention of the word *bug*. Even in 35 *megabytes* of Microsoft Windows 95 Resource Kit files, the word appears only once. There ought to be an entire chapter in the Resource Kit on how to isolate bugs in software. There ought to be a section in the Windows 95 tutorial that explains what bugs are and how to recover from them. And there ought to be an e-mail address where anyone can report a suspected bug with Windows or Windows applications.



Weak Links? With 400,000 copies of the Windows 95 Preview out, early reviews are in. The buggy MS Network and Exchange Server clients are still the main threats to an August arrival.

Find bugs and fix 'em. Microsoft already gets top honors for this effort. The bug-busting program for Windows 95 is unprecedented. In one extreme example, when Microsoft developers couldn't reproduce the bug that one beta tester was experiencing, they sent a messenger halfway across the country to pick up the problem PC and bring it to Redmond. It took minutes to track down the bug, and the tester had his machine back in 48 hours.

Then there's the story of the Windows development manager who rented a truck last fall, backed up to the local Egghead outlet, and drove away with $40,000 worth of software for compatibility testing. (How would you like to have been behind *him* in the checkout line?) And through the unheralded 10K programs, Microsoft developers have personally installed Windows 95 on 10,000 home and 10,000 business PCs in the real world. That's an impressive commitment to creating quality software.

Embrace bugs. If Microsoft can populate its new "social interface," Bob, with a lovable rat named Scuzz, it ought to be able to turn bugs into cute animated characters. Instead of intimidating GPF dialogs filled with tech-talk and memory dumps, why not have a plain-English explanation of what's going on?

In fact, why not make bug hunting into a sport with cash prizes? Put giant billboards along freeways in the Silicon Valley declaring all-out war on bugs. Provide a bounty for new, never-been-reported bugs. Give users free software and online time for clever bug reports.

Years ago, in a film called *Crazy People*, Dudley Moore played a frazzled Madison Avenue executive who checked into a mental hospital and turned the inmates into the hottest ad agency around. Their trump card was total honesty. (My favorite slogan: "Volvos. They're boxy but safe.") That agency would have a field day with the Windows 95 account: "Sure, we have bugs. But we fix 'em better than anybody."

Maybe it's not such a crazy idea after all.

PHOTOGRAPH BY JAMES McGOON

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- 1GB EIDE Hard Drive (10ms)
- 256KB Pipeline Burst Cache
- 15LS Monitor (15" CRT, NI)
- 64-bit PCI 1MB DRAM Video Card
- 4X Multi-session EIDE CD-ROM Drive
- MS Office 4.3, MS Bookshelf, Visio Express for MS Office
- 3.5" Diskette Drive
- Spacesaver Keyboard/Mouse
- MS-DOS 8.2/Microsoft Windows 3.1/30 Days Free Support

$2999

Business Lease: $111/Mo.
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XPS P100c WORKSTATION

Dell Dimension XPS P100c
A Pentium Processor-based 100MHz System

- Updated Pentium Chip
- Mini Tower Model
- 16MB EDO Memory
- 1GB EIDE Hard Drive (10ms)
- 256KB Writeback Cache
- 15LS Monitor (15" CRT, NI)
- 9FX Motion PCI 2MB VRAM Video Card
- 4X Multi-session EIDE CD-ROM Drive
- 3.5" Diskette Drive
- Spacesaver Keyboard/Mouse
- MS-DOS 6.2/Microsoft Windows 3.1/30 Days Free Support

**Add a Conner 200/400MB Tape Backup Unit for $199 more.*

$2799

Business Lease: $104/Mo.
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P75 MULTIMEDIA OFFICE

Dell Dimension P75
A Pentium Processor-based 75MHz System

- Updated Pentium Chip
- Mini Tower Model
- 8MB RAM
- 1GB EIDE Hard Drive (10ms)
- 256KB Writeback Cache
- 16LS Monitor (15" CRT, NI)
- 64-bit PCI 1MB DRAM Video
- 4X Multi-session EIDE CD-ROM Drive
- Sound Blaster 16 Sound Card
- Altec Lansing ACS-5 Speakers
- MS Office 4.3, MS Bookshelf, Visio Express for MS Office
- 3.5" Diskette Drive
- Spacesaver Keyboard/Mouse
- MS-DOS 6.2/Microsoft Windows 3.1/30 Days Free Support

$2199

Business Lease: $81/Mo.
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P90 WORKSTATION

Dell Dimension P90
A Pentium Processor-based 90MHz System

- Updated Pentium Chip
- Mini Tower Model
- 8MB RAM
- 540MB Hard Drive (12ms)
- 256KB Writeback Cache
- 16LS Monitor (15" CRT, NI)
- 64-bit PCI 1MB DRAM Video
- 4X Multi-session EIDE CD-ROM Drive
- 3.5" Diskette Drive
- Spacesaver Keyboard/Mouse
- MS-DOS 6.2/Microsoft Windows 3.1/30 Days Free Support

**Increase your available resolution - upgrade to 2MB DRAM for $59 more.*

$1899

Business Lease: $70/Mo.
Order Code #500085

P75 WORKSTATION

Dell Dimension P75
A Pentium Processor-based 75MHz System

- Updated Pentium Chip
- Mini Tower Model
- 8MB RAM
- 540MB Hard Drive (12ms)
- 256KB Writeback Cache
- 16LS Monitor (15" CRT, NI)
- 64-bit PCI 2MB DRAM Video
- 3.5" Diskette Drive
- Spacesaver Keyboard/Mouse
- MS-DOS 6.2/Microsoft Windows 3.1/30 Days Free Support

**Add a 3COM ELINK III Network Interface Card for $124 more.*

$1649

Business Lease: $61/Mo.
Order Code #500086

466D WORKSTATION

Dell Dimension 466D
IntelDX2™ 66MHz System

- 8MB RAM
- 365MB Hard Drive (12ms)
- 15LS Monitor (15" CRT, NI)
- Accelerated Local Bus Video with 1MB DRAM
- 3.5" Diskette Drive
- Spacesaver Keyboard/Mouse
- MS-DOS 6.2/Microsoft Windows 3.1/30 Days Free Support

**Add a 14.4 Fax/Modem for only $99 more.*

$1299

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Torture Test

Here's to our indestructible Dell® Latitude™ XP notebook. Back from *PC Computing*'s Notebook Hell and winner of the Best Overall Award in their Annual Notebook Torture Test.

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- 340MB Removable Hard Drive (810MB Max)
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- 32-bit Local Bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Expansion Slots
- 5.9 Pounds
- 3-year Warranty†
- 30-day Money-back Guarantee*
- Optional Advanced Port Replicator Available

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Business Lease: $137/Mo.

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- 8MB RAM (36MB Max RAM)
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- Smart Lithium Ion Battery with Advanced Power Management
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- 2 Type II/1 Type III PCMCIA Expansion Slots
- 5.9 Pounds
- 3-year Warranty
- 30-day Money-back Guarantee
- Optional Advanced Port Replicator Available

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DELL LATITUDE XP INTELDX4 100MHz SYSTEM

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Business Lease: $151/Mo.

- 9.5" Active Matrix Color
- 8MB RAM (36MB Max RAM)
- 340MB Removable Hard Drive (810MB Max)
- Smart Lithium Ion Battery with Advanced Power Management
- 32-bit Local Bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Expansion Slots
- 6.1 Pounds
- 3-year Warranty
- 30-day Money-back Guarantee
- Optional Advanced Port Replicator Available

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Dell Latitude XP

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- 340MB Removable Hard Drive (810MB Max)
- Smart Lithium Ion Battery with Advanced Power Management
- 32-bit Local Bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Expansion Slots
- Preloaded Communications Software
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- 810MB Removable Hard Drive
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- 32-bit Local Bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Expansion Slots
- Preloaded Communications Software
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Dell Latitude

IntelDX4 75MHz System

- 9.5" Dual Scan Color
- 12MB RAM (20MB Max RAM)
- 524MB Upgradeable Hard Drive
- $99 More For 2nd NiMH Battery (Slides into floppy drive to achieve extended battery life)
- 32-bit Local Bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Expansion Slots
- Preloaded Communications Software
- 6 Pounds
- 1-year Warranty
- 30-day Money-back Guarantee

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- 4MB RAM (20MB Max RAM)
- 524MB Upgradeable Hard Drive
- $99 More For 2nd NiMH Battery (Slides into floppy drive to achieve extended battery life)
- 32-bit Local Bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Expansion Slots
- Preloaded Communications Software
- 6 Pounds
- 1-year Warranty
- 30-day Money-back Guarantee

★*Add a versatile X-Jack modem for only $199 more.*

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75MHz COLOR UNDER $2000

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IntelDX4 75MHz System

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- 4MB RAM (20MB Max RAM)
- 260MB Upgradeable Hard Drive (524MB Max)
- $99 More For 2nd NiMH Battery (Slides into floppy drive to achieve extended battery life)
- 32-bit Local Bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Expansion Slots
- Preloaded Communications Software
- 6 Pounds
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- 30-day Money-back Guarantee

★*Double your RAM for only $200 more.*

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Business Lease: $74/Mo.

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ACTIVE MATRIX 100MHz

PRODUCT OF THE YEAR 1994

Dell Latitude XP

IntelDX4 100MHz System

- 9.5" Active Matrix Color
- 8MB RAM (36MB Max RAM)
- 524MB Removable Hard Drive (810MB Max)
- Smart Lithium Ion Battery with Advanced Power Management
- 32-bit Local Bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Expansion Slots
- Preloaded Communications Software
- 6.1 Pounds
- 3-year Warranty†
- 30-day Money-back Guarantee*
- Optional Advanced Port Replicator Available

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PC WORLD

Dell Latitude

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- 8MB RAM (20MB Max RAM)
- 524MB Upgradeable Hard Drive
- $99 More For 2nd NiMH Battery (Slides into floppy drive to achieve extended battery life)
- 32-bit Local Bus Video, 1MB Video RAM
- 2 Type II/1 Type III PCMCIA Expansion Slots
- Preloaded Communications Software
- 6 Pounds
- 1-year Warranty†
- 30-day Money-back Guarantee

★*Replace your desktop – add a 15" monitor, keyboard, mouse and AC adapter for $600 more.*

$2499

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A Pentium® Processor-based 120MHz System

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- 1GB Enhanced IDE Hard Drive (10ms)
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The Dell Dimension XPS P120c combines a 120MHz Pentium chip with a 512k pipeline burst SRAM cache for spine-tingling throughput. Yes, cybernauts around the globe will have speed and video performance rarely seen by beings in this vector. Which means desktop publishing, multimedia projects, database creation, spreadsheets, even code-creating endeavors get done way fast. So just give the boss some bigwig mumbo-jumbo about enhanced Q3 profit margins or something. And then procure one, fellow traveler.

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